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This Month

ARTICLES ABOUT

Bakery Products
Pages 223, 227, 237

Beverages
Pages 233, 237

Canned and Preserved Foods
Pages 230, 237

Confectionery and Chocolate
Pages 227, 237

Dairy Products and Ice Cream
Pages 227, 235, 237

Fats and Oils
Page 237

Flour and Cereal Products
Page 237

Meats and Meat Products
Pages 225, 237

Other Foods and Specialties
Pages 213, 234, 237, 245

Every Food
Pages 218, 221, 223, 225, 237, 245, 249

★

Cooking
Page 230

Distribution
Pages 221, 245, 249

Grinding
Page 230

Maintenance and Repair
Pages 223, 225

Management and Planning
Pages 221, 223, 225, 227, 235

Materials Handling
Page 230

Mixing
Page 230

Packaging
Page 251

Pumping
Pages 223, 225

Quality Control
Pages 230, 233, 234, 235

Raw Material Preparation
Pages 230, 233

Raw Material Selection
Pages 218, 227

Research
Pages 218, 235

Slicing
Page 230

Spoilage Prevention
Pages 233, 234

Temperature Control
Page 237

Trucking
Pages 245, 249

Weighing
Page 230

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Contents for May, 1936

Volume 8, Number 5

New Methods of Producing Raw Materials 218

How Food Manufacturers Select Advertising Agencies 221

Contending With An Unprecedented Flood 223

Gas Engines Meet Emergency Conditions in Flood Areas 225

Raw Material Selection Basic to Finished Product Quality *By B. J. Zenlea* 227

Controlling Serial Batch Operations *By M. P. Vucassovich* 230

Alkalinity Control of Ingredient Water *By H. Buttler* 233

Coffee Staling—A Reply to P. W. Punnett *By R. O. Bengis* 234

Putting Food Manufacture On a Merit System Basis *By J. H. Shrader* .. 235

Automatic Control for Batch Process Temperature 237

Trucks and Dated Coffee 245

Problems in Truck Transportation Discussed 249

Food Packages and Products 251

Departments

Talk of the Industry	213	**Catalogs**	257
Automotive Section	245	**Business Trends**	258
Packaging Section	251	**News**	260
Book Notes	252	**Company Activities**	262
The Plant Notebook	253	**Personals**	263
New Equipment	255	**Patents**	266

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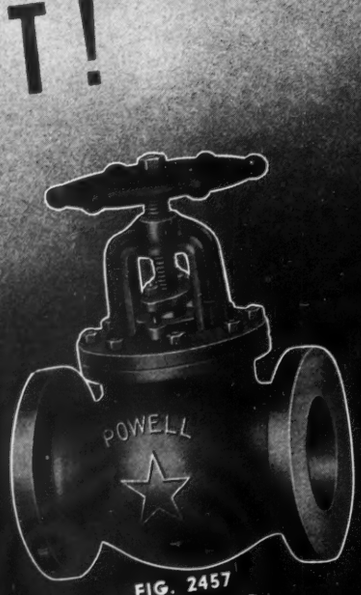

FIG. 2457
FLANGED END
GLOBE VALVE

FIG. 2453
FLANGED END
O. S & Y GATE VALVE

FIG. 500
SCREWED END
GATE VALVE

FIG. 1910
SCREWED END
GATE VALVE

FIG. 110
SCREWED END
GLOBE VALVE

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MAY 1936

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 8, No. 5

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Laurence V. Burton, Editor

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THE TALK OF THE INDUSTRY

NUTRITION NOTE: The thrifty production manager of a well-known food company recently took to his suburban home the laboratory's chickens which are no longer needed for nutrition tests, but he has acquired thereby a very perplexing problem.

These chickens had never lived outside a laboratory before. They knew

not how to scratch for feed, nor how to roost. If their food was not placed in a properly recognizable receptacle they went hungry. And when bedtime came they sat wherever they were, often in damp spots that might be conducive to colds. Eggs were laid anywhere.

After a hard day at the factory he would spend an hour in the evenings out in the chicken coop trying to train these chickens in the proprieties of life, but laboratory-bred birds present unusual problems of sales resistance. The ultimate solution was achieved only by placing a couple of old farm-bred hens in the laboratory-bred flock. Soon they were imitating the old-timers with vigor and, it is related, rugged individualism is developing.

TWICE within a week we have seen examples of that lack of creativeness that is said to have characterized the Dark Ages. Both examples were found in ads, one of which described a new line of footwear as V-16's. The shoes resembled "toothpicks" of the gay '90s. For the benefit of the younger customers, we may explain that the "toothpick" derived its nickname from the extremely sharp-pointed toes. Toothpicks, scorching, rubberneck, and pyrography were all of the same vintage.

The other example was a picture of an alluring young lady in what was rapturously described as "air conditioned pyjamas." Even in our overwrought and very excitable condition, induced by our efforts in the preparation of a June "Controlled Atmospheres" number of FOOD INDUSTRIES, we pause in our studies of air conditioning to ask, What d'yuh mean *"Air Conditioned* Pyjamas?"

LESS-ACIDITY NOTE: Whenever we see an ad for Luckies in the curent vintage of sales promotion of the American Tobacco Company, we are tempted to write to Mr. George Washington Hill. For one thing we should like to know what acids are less plentiful in Luckies than in other cigarettes. These acids should be identified individually—not lumped together as volatile and non-volatile acids. To estimate them as "citric acid" or as any other than their correct identity would not be answering the question.

And then, Mr. George Washington Hill would be required to tell why less of each of these acids is better for a person, and at what percentage the benefits begin, and why each one is harmful beyond the hypothetical threshold value. Next, we think he should inform us what pH is reached in the mouth of smokers of all the various kinds of cigarettes, and how he measures it, and how he compensates for the various degrees of mouth alkalinity or acidity, halitosis, and of buffering action of ptyalin and other constituents of saliva.

But shucks! A neighbor-lady who knows him well says that there is nothing so futile as trying to make Mr. George Washington Hill answer any kind of a question; that he derives a huge delight in evading answering any kind of questions pertaining to reasons behind his advertising campaigns.

So we shall merely wait to see how long it takes him to get Luckies over on the alkaline side along with White Rock and other forms of self-medication. Our guess is that it will occur before next autumn.

SPEAKING of Luckies, the American Tobacco Company is said to be the largest single customer of the maple sugar industry. A former employee of that company is authority for the information that something over 4,000,000 lb. of maple sugar goes into Luckies every year.

AN over-enthusiastic new subscriber is responsible for a disaster in our offices, the like of which we never saw before. Beside a ten-day accumulation of mail on our desk there

stood three jars of salad dressing to greet our recent return from the flooded sections of the country.

No sooner had we started to work on the fourteen-inch pile, than Blooey!!—a big jar of the salad dressing exploded.

A foamy yellow goo spread sideways, expanding as it went until a total volume of about two quarts was reached. And, of course, it had to strike everything on the edges, penetrating between letters to the extent of two and three inches.

If one jar was fermenting, how about the others? Hastily we wrapped a towel around each, lowered it gently into a metal waste basket and cautiously unscrewed the caps. Result—gobs and gobs of fermented salad dressing squirting violently from the threads of the cap. It took two hours to clean up the mess on the desk, wipe off each piece of paper and sponge ourselves.

Later we discovered a letter from the said new subscriber asking us to have his salad dressing analyzed and advise what was wrong. The analysis was made by the waste basket method, which as your chemist will inform you is derived from the sink method, and everybody agrees that it is just as good as graphite analysis.

Demand Common Sense Taxation

FOR once we have little to add to the clamor in Washington about the new tax bill, except to comment that we are wholly "agin' it."

Any thoughtful person contemplating the passing scene cannot but be impressed with the one failing common to all visionaries and idealists: the desire for ruthless power to compel all others to conform to their own pet ideas of what constitutes virtue.

To be sure there have been wicked men; but after an eventful life in all strata of society, we can personally testify that poor men do not embody all the virtues of life, nor is poverty synonymous with honesty.

Our representatives in the government, paid by all of us, instead of rejecting an iniquitous tax theory are trying to make something workable out of the fallacious idea that by impairing the sources of livelihood of the majority who happen to have jobs today, the less fortunate minority will be benefited in some way or other.

Common sense dictates: (1) that no such ruthless power should be granted in this fashion; (2) that a special tax commission should be created to study the problem of tax reform and prepare a new law to be later enacted by Congress. Such a commission would need an uninterrupted period of two or three years to do a thorough job.

This country has had far too much extemporized legislation, and by far too many senators and representatives who fail to rise to the obligations of statesmanship to which their election has called them.

If they fail to become statesmen they should be cast out at the next election!

To Corporation Presidents

CAPITAL in generous sums is known to be available for investments in common shares in well-managed enterprises where additional capital is needed for expansion, consolidation, reorganization, betterments or sales promotion campaigns.

Investment, not control, is the objective. Management must know its business thoroughly and have products that have a demonstrated public acceptance. Companies which are not now paying dividends, but could be placed in a definitely better earning position by judicious use of extra invested capital are the most likely to receive consideration.

If this is interesting please communicate with the editor.

A $200,000,000 Market Drying Up

FROM time to time attention has been directed to a trend in the South that ultimately will create larger problems for the Northern food manufacturers. Our first comment in this direction was in November, 1931, page 467, "Opportunity or Calamity." It is worth rereading in the light of today's news.

A recent statistical report from Dr. Julian Mann, in charge of Extension Studies at the State College of North Carolina, shows how active are these changes. For example, between 1929 and 1934 the hay crop in North Carolina increased 82.5 per cent; wheat, rye and barley increased 38.2 per cent; livestock rose from 1,833,315 to 2,070,557; cows and heifers, two years old or older, increased from 279,522 to 404,275, or 44.6 per cent. At the same time, cotton and tobacco acreage in that state decreased 39.7 per cent.

Hors d'Oeuvres

• In Salt Lake City a few years ago, a woman built a plant to produce carrot juice which she sold at cost. This lady was convinced that the juice was good for the health. She never made any laboratory tests to find this out. She merely drank the juice after doctors had given her one year to survive a stomach ailment. She recovered. Now a Utah firm is canning this product.

• *Mythology tells us that the artichoke came into existence when the gods, displeased with a beautiful young lady named Cinara, changed her into that fruit. Which may throw some light on why people will painstakingly strip the artichoke.*

• Hints for soup canners: In Central Africa, thick brown soups are made from locusts. The Hottentots, not to be outdone, prepare a coffee-colored soup from locusts' eggs. Soup made from sea slugs finds favor in many countries, while 165,000,000 Russians testify to the tastiness of bortsch, which contains bullock's blood and sour cream.

• *We hear that crabbing in Maryland and Virginia has been set back two years by the severe winter. Too bad it wasn't frozen out in other parts of the country. Or were they talking about fishing?*

• Doughnuts shaped like a crescent to faciltiate dunking are an innovation by a Toledo bakery. As many as half a dozen can be hung over the edge of a cup and completely saturated without even submerging the fingers.

• *Whether tin cans are good for beer we don't know, but we know they have been good for the brewers. The advertising battle which they stirred up between the can and bottle manufacturers gives beer no end of free promotion.*

• Wheat King Campbell received in AAA benefits $7 an acre for not growing wheat on land rented from the Indians at 50 cents to $1.50 an acre, getting in all $50,000. Not-farming on a mass-production basis certainly pays dividends.

• *Pittsburgh Packing & Provision Co. made the flood waters clean up after themselves. Workmen stirred up the deposit of mud on the plant floors as the water receded and let the dirt float out. A firehose finished the cleanup.*

Similar shifts to food and feed production are occurring in every cotton producing state, all of which means the corresponding loss of market for Northern states which formerly produced these crops for the Southern states, receiving cotton and tobacco money in return.

North Carolina has been a $200,000,000 market for food, food stuffs and feed from other states up to the beginning of the depression; but at the rate of change now under way that volume will disappear in a few more years. And with it will disappear a corresponding buying power of farmers and market for food processors in Northern states which formerly supplied the demand.

Your job may be that of a chemist, superintendent or plant manager. You may not have to solve the problems of directing the policies of your company, but this trend is a problem for you just as much as it is for your company president.

Unless cotton and tobacco exports pick up in a big way in the future there is going to be an equivalent shift of food production to Southern states. The foregoing figures taken from the State of North Carolina are but an index of the general trend.

Write Your Own Comment

WHILE milk control boards and others are still struggling to get the price of milk up to a point where the farmer is adequately repaid for his labors, and at the same time that the price of butter has slipped off badly, a movement is on foot in the Dakotas to increase dairy herds there by roughly a million cows.

What Is the Value of a Customer?

EVERY little while someone unearths a case of amazing lack of salient operating facts in the food business. It happened recently when an outsider casually asked the head of a successful company how much one retail customer was worth to his enterprise. He did not know. Asked to divulge the last annual profit figure of the company, the president responded freely.

"Then," argued the visitor, "if you divide the profits by the number of customers you will have the basis for capitalizing the value of a customer. How many customers have you?"

Neither the head of the company nor his associates knew the answer. All that they could tell was the maximum number of houses at which retail sales had been made at irregular but very frequent intervals. Even this did not actually represent the number of customers.

Until such figures are known there can be no real evaluation of the worth of a customer. And until the worth of a customer to a food company is known there can be very little intelligent planning as to what effort or what expense should be devoted to one of the most essential features of any business, its customers.

International

"A milk roundsman," as a milk route salesman is called in England, wearing one of the new safety belts at Tolworth, Surrey. Red crystal reflectors warn motorists in the dark of his presence. Note that this view shows the front of the cart and that the "roundsman" pushes it by hand. Hence the need of safety belts.

A Lesson From Broccoli?

MR. AND MRS. AMERICA, even Mrs. Restaurant Keeper, welcome new things for the table. Broccoli proves this. Its history even suggests some things that food manufacturers may well study for their own profit.

This newcomer of the cabbage family is not new at all in Europe. But its appearance on the American dinner table, variously sauced and garnished, is a comparatively recent event, altogether a post-War phenomenon. Recent figures indicate that its commercialization, really significant only since 1922, has progressed until now thirty million pounds are sold annually.

This thirty million pound market has probably been lost in large measure by processed foods. It is a reaction of the housekeeper and commercial dietitian against monotony, an effort for greater variety on the dinner table. It shows that the cost per portion on the table is neglected if the diner's resentment at too frequent recurrences of one food may be offset.

This means two things for food manufacturers: First, and most obviously, it means that every new processed food which can be devised will be welcomed cordially if it has real table appeal. Second, it suggests, perhaps not convincingly but still clearly, that perhaps too many processed foods lack distinctiveness of flavor, novelty of palate appeal.

We are reminded in this connection of a remark made recently in our presence by a discriminating housewife. Quite feelingly, though perhaps not altogether accurately, she commented, "All of Ex's soups taste alike." At the moment Mr. Ex might have been disposed, as we were, to reply with a denial. But a social function being no place for such argument, we were forced to refrain; and later we came upon what seems to us a fairer way in which to characterize Mr. Ex's soups. They are all splendid, but evidently the flavor or savor committee in the Ex factory likes one special combination of herbs and spices. That combination seems to dominate a dozen different formulas. Perhaps the factory formula would not bear us out, but the dinner table effect does.

If a thing so lacking in attractive

appearance, yet so distinctive in flavor as broccoli can be promoted in a few years to a thirty million pound market, perhaps food manufacturers had better strive for a bit more distinctiveness and novelty.

Unit Processes in Food Engineering

IN THE "blue pages" of this volume of FOOD INDUSTRIES two continuing series of articles have been running dealing with Unit Operations and Management Functions in Food Engineering. Later in the year a third series will be introduced dealing with Unit Processes. By definition, a unit process includes intentional and controllable changes of composition of matter such as: Baking, Blanching, Frying, Pasteurizing, Rendering, Hydrolysing, Refining, Fermenting, Tempering, and the like.

Unit processes are those changes where a certain amount of chemistry is involved; whereas unit operations are non-chemical, mechanical or physical in character.

Wet Insulation

COVERING an insulated tank with a polished stainless steel sheeting always makes a very trim looking job, but it may introduce some technical problems. If it is done at all it should be carried out with those problems in mind.

Unless the sheath is absolutely air tight there will be a certain amount of "breathing" when the tank contents are under alternate refrigeration and warming. Inevitably this causes condensation of water in the insulation under conditions where it cannot get away. That means wet insulation, heat leakage, money wasted, poor temperature control.

If there is any external evidence of frosting or fogging on the lower parts of the sheath around an insulating jacket, expect to find water in the insulation. A drainage connection with a cut-off valve into the sheath should always be installed to take care of this sort of trouble.

Fake Damage Claims

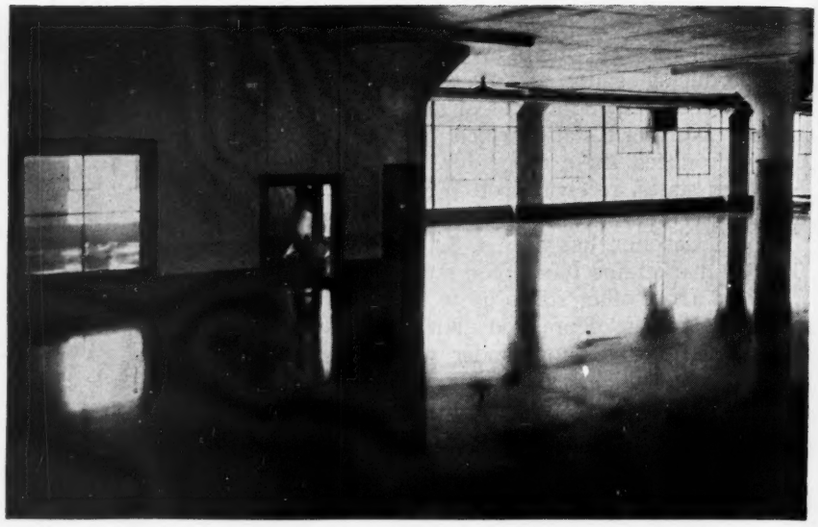
IN view of the growing number of damage claims against food manufacturers, based on the presence of alleged foreign substances or other causes, both the real and the presumably fraudulent, some branches of the food industries have set up independent machinery for the investigation of the validity of the claims for these alleged damages.

Such independently operating services should be coordinated and provided with a central records office in the larger cities. Some insurance companies are reported to have found between 10 and 20 per cent of this type of claimants are "repeaters." Under circumstances such as this, the value of a central records office becomes at once apparent.

Eastern cities in particular need a coordination of records for where each branch of industry conducts investigations separately, the time and effort consumed in ascertaining the validity of a claim is unnecessarily great. In this as in other activities of the food industries, the need of a united front and common understanding is very apparent.

At the request of several interested readers we offer our pages for a discussion of the problem and an examination of the needs of such proposed central claim records office.

What are your own views?



Here is the way a flood looks from a strictly inside viewpoint. Twenty-four hours before shooting this picture, this A.&P. warehouse at Springfield, Mass., was doing business as usual. But in the late afternoon the boys decided to evacuate the first floor, breaking all speed records at loading twelve freight cars. Not a pound of merchandise was lost.

The Spectacular Future

WHEN the production of raw foods becomes a semi-industrialized process, such as the new Gericke technique of tank agriculture, described elsewhere in this issue, with a productivity that is comparable to the remarkable yield per unit of area obtained in yeast culture, then this new technique comes very close to being a food industry. Certainly it appears to be just as much of a food industry as bean sprouting, vinegar manufacture, malting or vinification.

Out of deference to the expressed desires of Dr. W. F. Gericke, and the College of Agriculture of the University of California, the story we have printed on his development is told with a minimum of the dramatic and with a maximum of restraint.

But aside from the spectacular side of the development, it has two important aspects that deserve careful study. First of all: is the new method going to succeed in competition with products grown under ordinary natural conditions? Will the cost of production be low enough to permit its exploiters to operate at a profit? Will it require a Ph.D. chemist to supervise the new agriculture, or will it be a simple, foolproof system? How much power, heat and labor will be required?

Another question arises: If the new method succeeds commercially what will be its competitive effect on vegetable and fruit canning? Where will the newly developed frozen fruit and vegetable industry come in the future economic picture? What will be the effect on winter truck crop growers in Florida, Louisiana, Texas and Southern California? Likewise, what will be the effect on the southern market for other northern foods? If (and this is a big if) the new tank method of crop culture succeeds in a big way there are a host of other questions to which every branch of food manufacture will need the answers. Rather than speculate on what now appears to be very wide possibilities, we will restrict ourselves to the final thought that the future of

the food industries seems likely to be full of highly interesting problems. As soon as more factual knowledge becomes available, the data will be published in FOOD INDUSTRIES.

"Food Research"

A SPLENDID new scientific periodical *Food Research* has recently made its appearance guided by three able friends of ours, F. W. Tanner, Professor of Bacteriology, University of Illinois; S. C. Prescott, Dean of Science, Massachusetts Institute of Technology; and Dr. George J. Hucker, of the New York Agricultural Experiment Station. The board of editorial associates, comprising fifteen other outstanding scientists in the field of foods, with most of whom we are personally acquainted, together with the editors, insure its being the outstanding scientific publication in the field of foods.

The new journal is a welcome addition to the food industries and in particular fills a great need for a medium of publication of scientific papers in non-pathological food bacteriology.

Air Cleaning of Foods

THE use of a current of air to remove foods from foreign substances or vice versa has long been known. The fanning mill to remove chaff from grain, bits of pods and leaves from peas and cranberries is very old. More recent is the use of a strong air current to blow beans away from heavier objects, such as stones, and is well known to the coffee bean, cocoa bean and ordinary bean trade.

A new device was recently exhibited at the National Canners Association Convention for "Dry Cleaning Corn." It blows a current of air through the falling kernels of whole grain green corn after screening. The lighter waste material, such as husks, silk and small bits of cobs, are blown onto a traveling screen and thereby removed while the heavy kernels drop to a conveyor.

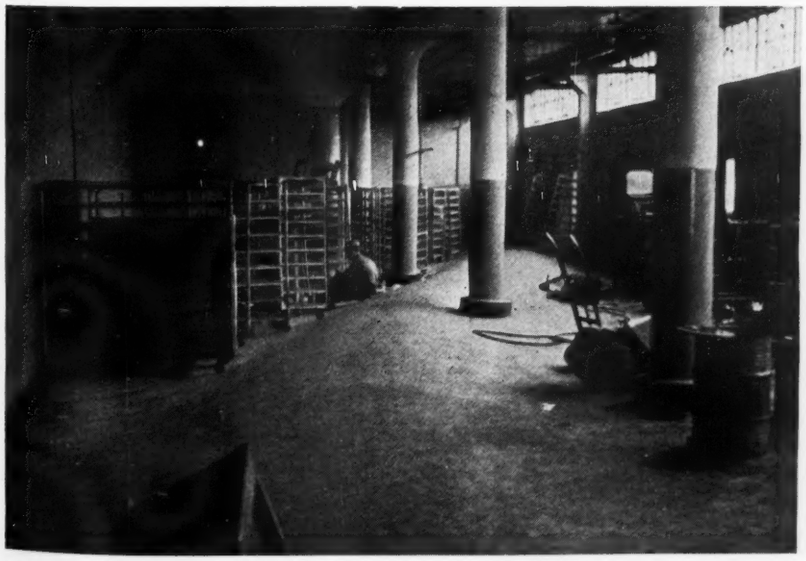
This new cleaning method is to substitute for the water flotation method of cleaning that is equally effective but which resulted in some loss of flavor and a higher percentage of waste of good raw material.

Floods and Disasters

PARADOXICALLY, FOOD INDUSTRIES is going to publish a series of articles that we fervently hope will not do our readers any good. Out of a detailed study of food plant experiences during the recent floods, a wealth of information has been obtained on ways to prevent flood damage and how best to recondition the plant and equipment if it has been submerged.

It is to be hoped that no plant will ever again go through the experiences that have characterized the past spring, but there is considerable likelihood that floods will be a recurring episode. Much can be done to avoid damage aside from moving the plant to higher flood-proof ground. Sometimes, however, floods will put a plant out of business even though water never reaches it.

In this issue appears the first of the discussions of the flood problem. Others will appear in subsequent issues of FOOD INDUSTRIES.



After the recent flood waters went down, a large New England bakery found all its maple floors had bulged in the middle like this, from 3 to 5 ft., necessitating complete replacement. Half the cost of flood damages in this plant was to replace the floors.

Pass the Guffey-Dockweiler Bill

COMMON sense indicates that the Guffey-Dockweiler bill should be enacted to eliminate the 3 cent per pound excise tax on coconut oil when denatured so that it is useable only for soap making.

Active champions of butter and cottonseed oil should be informed that in soap technology there is no adequate substitute for coconut oil. And hiking the cost of soap does not increase the consumption of butter nor the profits of dairy farmers or butter makers.

The Coming Weather

TO BECOME a successful soothsayer, *i.e.*, a predicter of the future, on one single occasion, is an achievement that brings in its wake a whole series of troubles. On many sides are now arising requests from readers that we forecast the weather of 1936 as a result of a few private communications last year about the probable weather of last winter.

Right now we deem it wisest to rest on our laurels—such as they are—and omit any guesses as to the future until other urgent duties permit us to give it more study.

One authority has stated that 1936 weather will repeat 1913 weather. Another predicts a drought for 1936 which ought to be easy to follow. Those who are interested should watch the weather map and, in particular, trace the path of the high pressure areas. If they move from east to west, in the main, there is less likelihood of a drought in the region from the Appalachians to the Rockies than if they move chiefly from north to south. In the latter case, when the high pressure areas leave Alaska in mid-summer and move down central Canada, enter the United States in the Great Lakes regions, the weather to the west of the line of travel will be largely hot and dry. To the east of the line the weather will be cooler and probably wetter. Such a condition occurred during the week of April 15.

New Method of Producing Raw Materials

Facts, at Last, Regarding Tank Agriculture

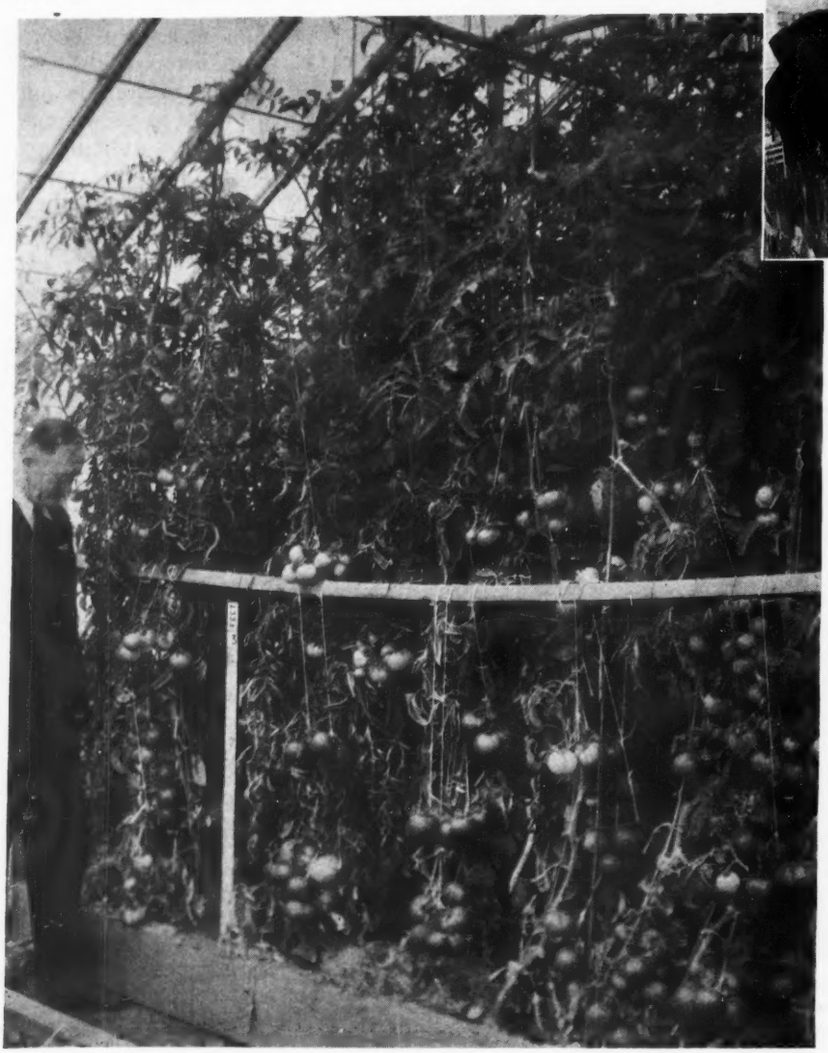
RUMORS, hearsay and popular magazine articles of the type of "Chemistry Wrecks the Farm," appearing in *Harper's* last summer, have spread much unreliable news of impending significant developments in agriculture. Up to now the actual facts have been kept as much of a secret as is possible with rather large agricultural experiments from seekers after sensational news.

Authentic information now available, less sensational than some of the earlier unconfirmed reports, is significant enough to beggar the imagination. Crop yields are obtained by the new tank method of agriculture that are unheard of in anything previously known.

FIG. 1

FIG. 2

FIG. 3



Tomato plants so large that the fruit must be picked from a stepladder (Fig. 4) are yielding in commercial tests at the rate of 217 tons per acre of tank surface per year. This compares with the normal outdoor yield of about 5 tons per acre.

Potatoes have been produced at the rate of 2.4 lb. per sq.ft., or 2,465 bushels per acre, of tank surface without utilizing the maximum of growth stimulating conditions. Compare this with the United States average of 116 bushels per acre in 1934.

Tobacco plants, 22 ft. high have been grown under conditions suggest-

Material on which this article was based was obtained from May, 1936, *Electrical West*, and April, 1936, *Agricultural Engineering*. Illustrations were provided through the kindness of Dr. W. F. Gericke, the developer of the technique.

FIG. 4

Figs. 1 and 2: Tomatoes in both pictures are three months old and grown in nutrient liquid. Left: Unheated control. Right: Shows effect of proper temperatures.

Fig. 3: In four months the harvest of ripe fruit begins.

Fig. 4: Dr. W. F. Gericke, 6 ft. tall, looks at five months old plants. In another month it was necessary to climb a stepladder to pick the fruit. (Sorry, but there are no pictures of one year old plants.)

TIMELY WARNING

THE commercial enterprises now in operation are under Dr. Gericke's direction and his personal attention is required from time to time to devise such alterations in cultural technique as the circumstances may warrant. Cultural technique must be adjusted to meet not only the character of the crop grown but also the climate in which it is grown; and consequently before the method can be made available for general use it needs to be tested over fairly wide geographical distribution. These tests should be supervised personally by Dr. Gericke from time to time, and any needed cultural adjustments made.

These experiments represent the next phase of the investigations to be undertaken and they are to provide the information required for preparation of full and reliable directions for the ultimate general use of liquid culture media for crop production. The integration and interpretation of data on the response of plants to diverse climatic conditions furnishes the basis for the needed information. A limited number of tests, organized as commercial enterprises and located over a fairly wide geographical distribution, will be undertaken as soon as arrangements can be made. It is the purpose of this comment to save Dr. Gericke's time in answering inquiries for interested persons who would not be in position to aid the development of the enterprise.

[The foregoing statement has been published here at Dr. Gericke's suggestion.—Ed.]

ing the possibility of complete control of the quality of the leaf, thus circumventing the fact that rank growth of tobacco and poor quality are always associated.

Beets, turnips, carrots and celery have also been grown by the new method and have shown amazing production per unit of area.

Commercial installations for the culture of tomatoes and strawberries by the new method are now in existence. Likewise small scale commercial tests are now being made on many other plants, including gladioli and sweet peas, and cucumbers and papayas.

The principle involved is the culture of fruits, vegetables or flowers in a heated nutrient liquid culture medium instead of the customary soil. Seven years of experimental work conducted by Dr. W. F. Gericke, Associate Plant Physiologist, University of California, have culminated in commercial installations of the foregoing character.

The Gericke technique consists of supplying the nutriment element essential to plant growth in water contained in concrete or redwood tanks, and maintaining this fluid at a constant temperature by means of electric soil-heating cable. (A closed circulating system for heating the fluid, in which the heat is supplied by combustion of natural gas, has been employed in one commercial installation in place of electricity.) On top of the basins is a wire screen covered with excelsior, peat moss or straw to prevent the seeds from falling into the fluid. The seeds are planted in this covering and then a supplementary covering of excelsior, straw or rice hulls is provided which will support the young plant and provide insulation against heat losses by radiation

Yield of Ripe Tomatoes Grown in Tanks For Twelve Months

Tank Area = 25 sq.ft.

Tank No.	Temp. of Solution, Deg. F.	Ripe Tomatoes Harvested: Per Tank, Lb.	Per sq.ft. Tank Surface, Lb.	Yield Calculated to per Acre Basis, Tons	Variety of Tomatoes Tested
1	70–75	297.4	11.9	258	Sutton's Best of All
2	70–75	301.3	12.05	261	Sutton's Majestic
3	80–85	273.4	10.9	237	Sutton's Best of All
4	80–85	352.2	14.1	305	Sutton's Majestic
5	55–65	51.0*	2.1	45.5	One row each variety

*"The check tank was discontinued when plants were 7½ months old; the yield would have been greater if the plants had been allowed to grow the full test period."

Editor's note: one acre = 43,560 sq.ft. One lb. per sq.ft. = 21.78 tons per acre.

from the liquid below. As the seeds sprout, their roots extend into the liquid culture medium from which they absorb their food. In the case of tomatoes, transplants are made as usual. Contrary to some of the hearsay tales regarding the new method, natural light and temperature changes have been found to be essential to maintain proper plant photosynthesis. To date most of the experiments have been conducted in unheated greenhouses all located in California.

Success of the technique depends essentially upon the adequate supply of plant food made available under conditions most favorable for assimilation and plant growth. The nutrient salts are placed in a "fertilizing unit" —a glass bottle in the tank and so designed to permit slow diffusion into the water. Ten or more of these food elements in all are used and are mixed in definite ratios depending on the species of the plant and the climate where the crop is grown. In a 25-sq.ft. tank there were needed seven such 1-lb. units in twelve months. A carefully controlled, slightly acid reaction in the solution is maintained by the use of sulphuric acid. All of the ingredients today are said to be products of the heavy chemical industries, but up to now no information has been published regarding their identity.

Concrete tanks were used in the commercial installation at Capitola. Cross-members are strips of wood to support the wire netting on which the tomatoes grow.

Vetterle & Rienelt installation at Capitola completed and the new crop just starting. This unit should produce about 95,000 lb. of tomatoes in twelve months. There are 66 tanks 36x4 ft. Note that a huge amount of labor is required to tie up all the plants. Plantings are at the rate of one plant per 1¼ sq.ft. water surface.

The new technique appears to apply most successfully and economically to those species of flora that are high in water, sugar and starch content, and where the quality or intrinsic value is important. Inasmuch as the composition of plants can be affected, it seems possible that some unique characteristics may be imparted to certain food crops.

Dr. Gericke's successful experimental work on which the commercial applications for tomato production have been based, were conducted with a large array of plants. Sheet metal basins 10 ft. x 2.5 ft. x 8 in. containing 15.65 cu.ft. of water and heated with a standard 60 ft. length of soil heated cable were employed. The various temperatures were maintained in the solution with a majority of tests running at 75 and 85 deg. F. by thermostatic control.

With tomatoes, surprisingly large yields were produced. Practically every flower produced fruit, and numerous trusses of Sutton's Best, an English greenhouse tomato, contained from 15 to 25 tomatoes. Where ample room for growth has been available plants have attained a length of 25 ft. and have borne fruit over the entire length.

Commercial installations employing the new technique for raising tomatoes are now in operation at Capitola in central California, and Montebello in southern California.

The following data is based on Table 2, in an article by Gericke and Tavernetti, *Agricultural Engineering*, 17, 141, April, 1936.

The Montebello commercial installation employs a system of heating the nutrient liquid by recirculating the liquid through a central boiler fired by natural gas, instead of heating it by submerged soil-heating electric cables. A supply of pipe from the boiler extends along one side of the rows of tanks without outlets controlled by valves at each tank. A varying quantity of the warm liquid is allowed to flow into the tank. A

(Turn to page 266)

How Food Manufacturers Select Advertising Agencies

By THOMAS G. MacGOWAN
President, Facts, Inc.,
New York, N. Y.

ADVERTISING agencies when soliciting new business from food advertisers are, in most cases (as when they make presentations to advertisers generally) failing to indicate that they are competent on the point which these advertisers consider the most important in selecting a new advertising agency.

This is apparent from the replies of the 44 food advertisers whom we interviewed in our nation-wide advertising survey. Fourteen were large (spending more than $500,000 a year on advertising); 15 medium-sized ($100,000 to $500,000); and 15 small (less than $100,000).

On this matter—knowledge of the prospective client's industry and market—agencies are deficient in the opinion of 88.2 per cent of the food advertisers and of 86.6 per cent of all the 225 advertisers whom we questioned. Advertisers of all sizes shared this opinion.

The only advertisers in the food field and in the survey as a whole, who did not give to this knowledge first rank among their agency-picking considerations were the large ones, who thought it less important than the ability to turn out good copy and layouts, and produce acceptable plans.

All advertisers, including those of food products, ranked specific preparations to handle the account, including the acquiring of the requisite background knowledge, ahead of general indications of ability and facilities, recommendations, reputation and a satisfactory compensation basis. Food advertisers give somewhat greater emphasis to indications of preparation and ability and somewhat less to the other considerations than do advertisers generally.

However, in the matter of selecting an agency of one size instead of one of another, advertisers, including those who sell foods, say the chief determining factor is the expectation that the chosen agency will give better service and closer attention to the account than those not picked. Food advertisers are more prone to pick small agencies than are other advertisers, although the greatest number of them select medium-sized ones, as is the case with advertisers in all lines. In the food field advertisers are more likely to pick an agency in their own size class than are advertisers of other commodities.

We sought the answers to the following questions:

1. What weight do food and other advertisers attach to their various reasons for selecting certain advertising agencies?
2. What sizes of agencies do food advertisers and other advertisers favor?
3. To what extent does the average advertiser in each size classification favor agencies of the various sizes, and what are the reasons behind his decision to employ an agency in his own size class or to go out of his class in making an agency change? Are these reasons common to both food advertisers and others?

The data were developed from four questions asked of key sales, advertising and administrative executives. The first was:

"WHAT considerations chiefly govern your selection of an advertising agency?"

The executives were asked to respond by giving a rank number (1, 2, 3, etc.) to a check-list of thirteen factors, in the order of their importance to them. Most of them ranked all the factors. We developed an average ranking for each. The factors rated as of greatest average importance are represented by the lowest average rankings. A mention of "first" was given a weight of "1" in the averages, one of "fourth" a weight of "4," etc. Mentions of "no importance" were given a value of "14." When the responder, stopping after giving rankings to several considerations, said "the rest have equal weight," the unused rank numbers were averaged, and this average number was given to each.

In the food field, the leading considerations proved to be the following:

	Average Rank
Familiarity with products, industry and market	3.91
Ability to produce good copy and layouts	4.13
Ability to create good plans	4.48
General reputation	5.97
Proof of sales effectiveness of work	6.05
Satisfaction with a campaign proposed by an agency	6.74

These reasons were also the leaders in the survey as a whole, and they were ranked by all advertisers in the same order, with little difference in the average rankings. It is interesting to note that the last item, so important an element in many agency account-getting efforts, secured only a median rating.

In ranking the remaining seven considerations, the food advertisers differed somewhat from the others in their preferences. "Recommendations by clients" they put next to the end of the list, while advertisers in general ranked it ninth. They placed "clients served" ahead of "clients held," and they thought "a good merchandising department" more important than "a good media department," instead of the reverse in each case.

Analysis of the detailed rankings

shows that with food advertisers as with others, the smaller the advertiser the greater his interest in background knowledge and the larger the advertiser the greater his emphasis upon copy, layout and plans.

Grouping the thirteen factors by types of agency qualification desired by food advertisers we get the following:

	Average Rank
Specific preparation for handling the accounts (2 factors)	5.33
General qualifications as to ability and facilities (6 factors)	6.59
Recommendation, reputation, clients, etc. (4 factors)	7.43
Compensation basis (1 factor)	9.70

The order is the same in the survey as a whole, but with these rankings: 5.35, 6.67, 7.06 and 9.21. Advertisers of all sizes, food and other, rank the general types of agency qualification in this order.

"DO agencies seeking your account generally have adequate knowledge of your industry and market?"

The uniformity with which all sizes of food advertisers say agencies are deficient on this point is shown in the following tabulation of the negative answers:

	Per Cent
Large food advertisers	90.9
Medium-sized food advertisers	90.9
Small food advertisers	83.3
All food advertisers	88.2

Among all the advertisers interviewed the same tendency of the larger advertisers to give the more favorable verdicts on agencies' background knowledge is apparent from this division of the negative responses: large advertisers, 88.9 per cent; medium-sized, 84.7 per cent; and small, 86.3 per cent. The general average for the whole survey was 86.6 per cent.

"DOES your experience show that an appropriation the size of yours is best administered by a large agency, a medium-sized agency or a small agency?"

Here we find that medium-sized agencies are the most favored by food advertisers:

	Per Cent
Prefer large agencies	25.0
Prefer medium-sized agencies	31.8
Prefer small agencies	29.6
Have no clear preference	13.6
	100.0

The percentages for the entire survey are: prefer large agencies, 28.0 per cent; prefer medium-sized agencies, 32.3; prefer small ones, 23.8; and have no clear preference, 15.9.

Nearly half the food advertisers prefer to go out of their own size classes in picking new agencies:

	Per Cent
Prefer agencies in their own size classes	40.9
Prefer agencies out of their own size classes	45.5

Advertisers generally are somewhat less inclined to stay in their own agency size groups; only 38.8 per cent of them do so, while 45.3 per cent prefer agencies of other sizes.

Sizes of Agencies Preferred by Advertisers

Advertisers	Prefer Large Agencies (per cent)	Prefer Medium-sized Agencies (per cent)	Prefer Small Agencies (per cent)	Have No Clear Preference (per cent)	Total (per cent)
Large					
Food...	50.0	28.6	0.0	21.4	100.0
All.....	42.3	23.9	7.0	26.8	100.0
Medium					
Food...	26.7	26.7	40.0	6.6	100.0
All.....	24.3	37.8	28.4	9.5	100.0
Small					
Food...	0.0	40.0	46.7	13.3	100.0
All.....	17.4	34.8	36.2	11.6	100.0
Total					
Food...	25.0	31.8	29.6	13.6	100.0
All.....	28.0	32.3	23.8	15.9	100.0

In the food field 50.0 per cent of the large advertisers prefer large agencies, while only 26.7 per cent of the medium-sized advertisers like agencies of medium size and 46.7 per cent of the small advertisers stay in their own agency size classifications. In the whole survey, the percentages of advertisers' loyalty to their own sizes of agencies were: large, 42.3; medium-sized, 37.8; and small, 36.2.

What are the reasons why medium-sized agencies are the most popular, and why do so many advertisers of each size-group select agencies out of that size classification? Why, for example, do so few medium-sized food advertisers like medium-sized agencies?

WE asked advertisers for the reasons behind their agency size-preferences. Whichever size of agency they chose, the hope of securing better service and closer cooperation looms up as an easy leader in the food field:

	Per Cent
Want better service—closer cooperation	43.0
Want more complete facilities	20.0
Want better talent	10.0
Other reasons	27.0
	100.0

For advertisers generally the percentages are closely similar: 45.6, 20.1, 19.1 and 15.2.

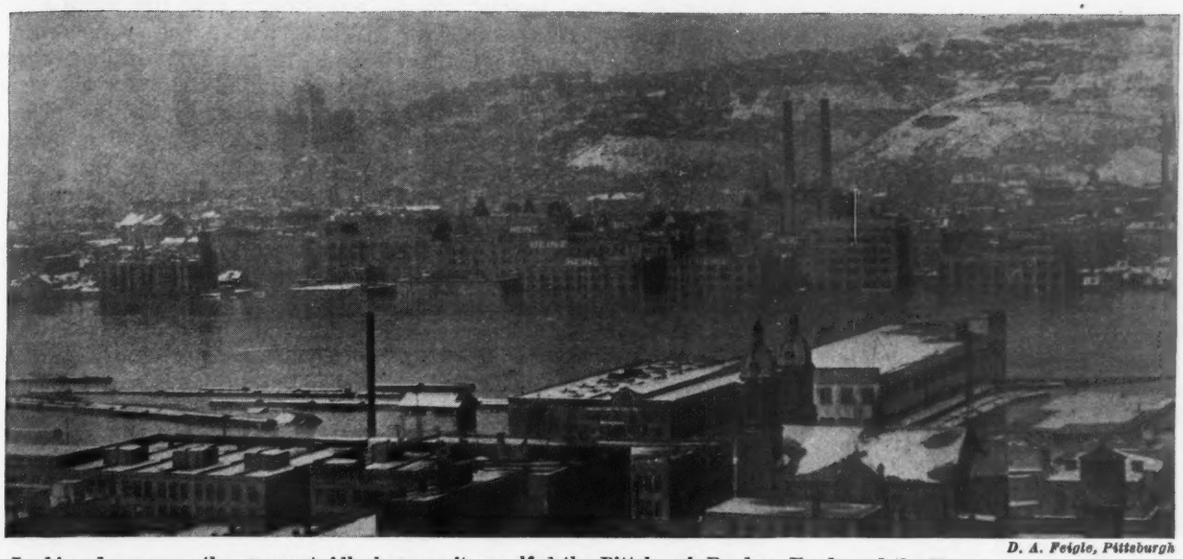
We find, as might be expected, that the large advertisers take more interest in getting more complete facilities than in securing better attention. The reasons underlying their size-preferences are divided this way: better attention, 28.6 per cent; more facilities, 35.7; better talent, 7.2; and other reasons, 28.5.

Medium-sized advertisers line up like this: better attention, 40.0 per cent; more facilities, 15.0; better talent, 20.0; and other reasons, 25.0 The small advertisers' size-preferences are grounded as follows: better attention, 56.3; more facilities, 12.5; better talent, none; and other reasons, 31.2.

The reasons of all the advertisers interviewed in the survey, when broken down by size groups, followed the same lines.

Advertisers' Ranking of Considerations Which Govern Their Selection of Advertising Agencies

	Food Advertisers						All Food Advertisers		All Advertisers	
	Large		Medium		Small					
Considerations	Order of Rank	Average Rank	Order of Rank	Average Rank	Order of Rank	Average Rank	Order of Rank	Average Rank	Order of Rank	Average Rank
Familiarity with product, industry and market	3	5.92	1	2.57	1	3.50	1	3.91	1	3.98
Ability to produce good copy and layouts	1	3.77	2	4.20	3	4.37	2	4.13	2	4.00
Ability to create good plans	2	4.35	3	4.90	2	4.17	3	4.48	3	4.41
General reputation	4	6.08	6	5.37	6	6.47	4	5.97	4	6.07
Proof of sales effectiveness of work	6	7.00	5	5.27	5	6.00	5	6.05	5	6.34
Satisfaction with campaign proposed by the agency	11	9.08	4	5.17	5	6.30	6	6.74	6	6.73
Clients held	7	7.35	9	7.63	7	6.80	8	7.26	7	6.98
Clients served	5	6.19	10	7.90	8	7.17	7	7.13	8	7.27
Recommendations by clients	10	8.77	12	9.20	13	10.03	12	9.36	9	7.91
Research ability and facilities	9	8.35	8	7.50	9	7.93	9	7.91	10	8.22
A good media department	11	9.08	7	7.23	12	9.57	11	8.60	11	8.38
A good merchandising department	8	8.18	9	7.63	10	9.17	10	8.34	12	8.67
Satisfactory compensation plan	12	10.25	11	8.97	11	9.97	13	9.70	13	9.21



D. A. Feigle, Pittsburgh

Looking down upon the rampant Allegheny as it engulfed the Pittsburgh Produce Yards and the Kroger Grocery & Baking Co. warehouse in the foreground and the H. J. Heinz Co. plant on the north bank.

Contending With An Unprecedented Flood

Defenses set up as result of experiences with previous floods proved inadequate to keep flood waters out of plants in low-lying areas. Seven feet of water on first floor of a baking plant shut down production operations for three days. Latest experiences lead to installation of source of power and steam on upper floor of plant as a means of coping with another such emergency.

EVIDENCE that "the 1936 flood was different" is found in the way this flood swept over the defenses employed to prevent a shutdown of plant operations during the expected annual spring flood periods.

Details of these defenses vary somewhat according to the terrain of the locality in which the plants are situated and to the type of food manufactured. In the main, however, the plants are built with the first or street floors safely above the previous record-breaking high water level and with the basements or boiler rooms under the plants protected by built-up concrete wells for windows and doors and by pumps capable of removing seepage or backed-up sewer waters as fast as they enter the lower plant areas.

Braun Baking Co.

Flood waters from the Ohio River, approximately 10 ft. above previous high water level, temporarily converted city streets into water ways and rendered ineffective usual defenses against flooding of food plants situated in the flooded areas. In the right foreground is the plant of the Braun Baking Co., of Pittsburgh, Pa. Across the street in the background is that of Cruikshank Bros. Co., makers of pickles, preserves and jellies.

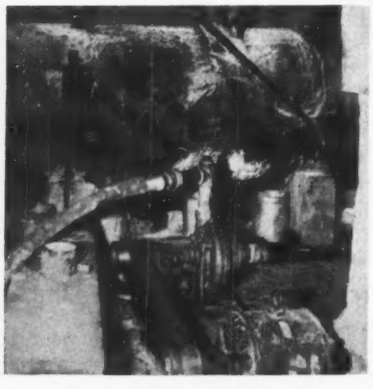
Manufacturing or processing operations are performed on the upper floors with the finished products coming to the first floors for shipment or very temporary storage. Only those supplies and stocks which are easily removable are stored for any length of time on or below the first floor level. The basement areas are quite generally limited to use

for power producing, heating, and refrigerating equipment, for repair shops, and for elevator pits. Centrally located sewer drains and water-collecting sumps usually make easy the removal of excess water.

In spite of these defenses the flood of Wednesday, March 18, put some food plants out of operation for a period of one to several days. The experiences which befell the Braun Baking Co. of Pittsburgh, Pa., may be regarded as typical for those flooded plants situated in what is generally known as the Ohio River valley bottom lands.

In this plant the first floor is approximately 3 ft. above the street level—easily 2¾ ft. above previous high water level—and is used mainly as a shipping floor to which baked goods are delivered in wheeled trucks or racks from the production floors above and from which the delivery or sales trucks are loaded at truck floor level.

This plant construction gave the first floor protection against flood waters of a 36-ft. river—the 1907 high water level—because the plant sits on relatively high ground, even though it is only about a quarter of a mile from the north bank of the Ohio River and on bottom-land location. Even for the 1936 flood this protection was sufficient to make possible the loading of Tuesday night's bake onto sales and delivery trucks and getting the trucks out for approximately a 100 per cent delivery on Wednesday. Also the closing of the sewer openings with wooden plugs and the operation of the 2-in. electrically-driven gear-pump kept water in basement and boiler pit at a safe level pending the obtaining of additional centrifugal pumps as supplementary aid in combatting the steadily rising water.



IN the meantime supplies from basement and first floor storage were being removed by elevator to safer levels. The waters continued to rise to levels above a 36-ft. river until they poured into the plant from all sides in spite of protective measures and at the height of the flood the first floor was covered with 7 ft. of water. Jamming of the elevator prevented removal of all supplies from lower plant areas and the rapidly rising waters stopped even the manual transfer of the lighter-weight units.

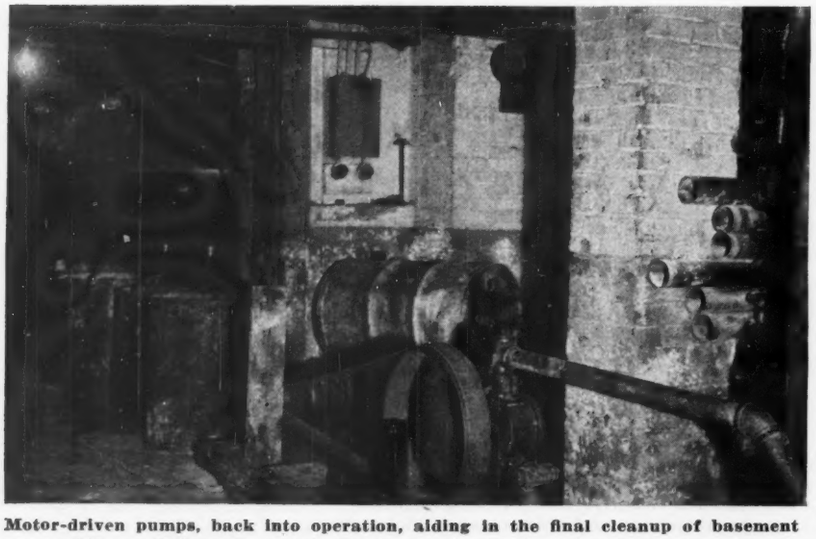
With the receding of the waters on Thursday and Friday to levels below a 36-ft. river all obtainable manually operated pumps were pressed into service to get water out of basement and boiler pit. By jacking up and removing a rear tire from a 1½-ton White truck, belt connection was made to a pump ordinarily motor-driven and all the water was removed so that cleaning up the plant and equipment could be gotten under way.

By Saturday noon the plant was ready for operation as soon as electric power and light could be obtained. Fearing a food shortage in the city, Duquesne Light Co. gave bakeries, dairy plants, and meat packing plants special service, as did electrical repair shops equipped to recondition motors. By 5:30 p.m. Saturday, March 21, this flooded plant was back into full operation. Its water and gas supply lines as well as its ovens and other bakeshop equipment located on the upper floors had not been affected by the flood. As one of the boilers is gas-fired no delay was necessary for obtaining a supply of fuel which had not been water-soaked during the flood.

Availing itself of a lesson learned in connection with this flood the Braun Baking Co. is installing a 75-hp. upright boiler on the third floor of its plant as a counter move against a repetition of the 1936 flood which put the plant out of operation for three days.

Another step towards putting the plant in better position to meet emergency demands is the installation of a 2,000-lb. per hour Petersen traveling tray oven to replace old-fashioned low-production peel ovens. The new oven is gas fired and operates under automatic control on gas feed and steam pressure. A time-clock device reading in minutes of baking time makes possible the operation of the oven under time control also. In construction the oven is of steel frame with white enamel surface and has aluminum painted steel trays fitted with soapstone hearths.

Illustrative of the efforts made by food manufacturers in the flooded areas to prevent a food shortage, the Braun Baking Co. as soon as its Pittsburgh plant went out of operation, arranged with as many as twenty baking companies remote as Jamestown, N. Y., Warren, Pa., and Cumberland, Md., to supply it with bread to meet the needs of its customers. When these arrangements were made, it was thought that ten days or two weeks might elapse before electric power and light would be available. Excess bread supplies resulting from the quick resumption of plant operations were turned over to the Red Cross and similar relief agencies.

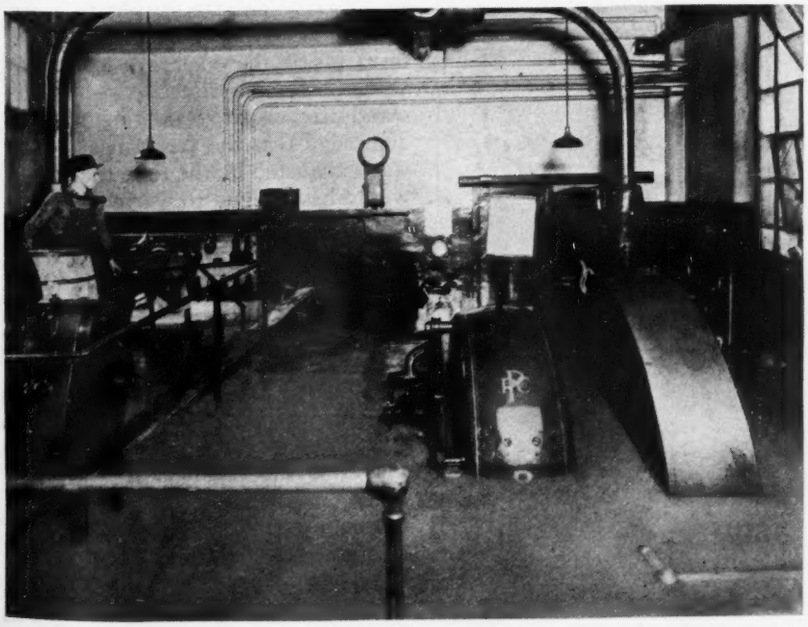


Motor-driven pumps, back into operation, aiding in the final cleanup of basement areas of Braun Baking Co. plant. No spectacular deeds or heroic feats accompany the removal of flood water sediment or the recovering of insulated tanks and pipes. That aftermath of a flood is just plain, dirty and tiresome work.

Gas Engines Meet Emergency in Flood

Simple in construction and far from impressive in appearance, this gas-powered pump is the hero of the Peters Packing Company's battle with the flooded Youghiogheny River

Scant inches of basement window ledging prevented direct flow of flood water into the plant. Seepage water was removed by the 4-in. gas-powered pump as fast as it found its way through the basement walls.



Relentless in its encroachments, the raging Youghiogheny showed no mercy toward the unprotected power plant. The 66 kva. generator on the left and the 132 kva. generator on the right had to submit to a muddy bath. Yet in less than 24 hours the smaller unit was again supplying electric current to the plant production machinery.

DURING and following the recent record-breaking flood in the Pittsburgh, Pa., region, the portable gas engine came into greater recognition as a valuable piece of equipment to have about a food manufacturing plant.

A specific example of the rôle played by a portable gas engine was found in the plant of the Peters Packing Co , McKeesport, Pa., on the banks of the Youghiogheny River. At this plant the engine drove a centrifugal pump with a 4-in. intake and kept the plant free from water although water was everywhere about the plant. It was later used to keep the boilers going by pumping water from the river until feed water was obtainable from the city mains.

Under normal conditions there was no shortage of pumps as the plant was equipped with a 4-in. steam syphon generally used when the demand-load for electricity was heavy and, when the demand load was not so great, the excess water was removed by a 4-in. centrifugal pump driven by plant-produced electricity. As an auxiliary or standby unit in case of shutdown of boilers, the plant had a second centrifugal pump on a 4-in. line and driven by current purchased from the public utility, Duquesne Light Co. This combination of pumps when operating as a composite unit would handle from 125,000 to 150,000 gal. of water per hour. It was upon these pumps that the Peters Packing Co. generally relied to handle the waste water from its byproduct plant and to keep its production plant free from seepage waters.

IN building the plant advantage had been taken of the lay of the land to get excellent protection against the usual spring rises in the river. The plant as a whole is situated partly upon a slight side hill, partly over a street underpass, and partly over an understructure consisting of livestock pens and a byproduct plant. It is upon this plant arrangement, which to date has protected the production areas from all except seepage water, and the effectiveness of the pumps that the company had heretofore staked its freedom from flood water damage.

Consequently when on March 17 periodic reports from the McKeesport Chamber of Commerce and hourly reports from Chief Captain Howder, Head of River Shipping, Hillman Transportation Co., indicated flood conditions starting a hundred miles up the Monongahela and Youghiogheny Rivers, only the ordinary preparations were made for a high-water river.

These preparations consisted of removing part of the inventory stock from the byproduct plant and the cattle from pens in the portion of the plant near the river. Also all pumps were tested to make certain of their being in first-class operating condition. In the face of all the warnings, a flood height of approximately 36 ft. was regarded as the maximum height the river was likely to rise and preparations to combat it at that level were made accordingly. Such was the situation between 7 and 11 p.m., March 17.

By the latter hour, however, the river conditions had become such there was an uneasiness that the river might exceed former flood levels and cause a shutting down of the public utility power station as well as the plant boilers. This shut-down in turn would stop all pumps, result in a flooding of the plant which had been kept dry up to this time, and endanger the heavy stock of fresh and cured meats in the coolers.

Acting on these fears, negotiations were opened with a nearby bridge construction concern for the loan of its portable gas-driven pump which could be slowed down or speeded up, as the occasion demanded, to handle from 9,000 to 50,000 gal. of water per hour. The pump had a 4-in. intake and discharge and was mounted so as to be movable to any location desired.

Before 2:30 a.m. the fears were fast becoming realities. So much so that the pump was obtained and subjected to performance tests to make certain it was set to go when the need became urgent.

As the boiler house was not sealed off to prevent an almost direct inflow of water through doors and windows no attempt was made to keep it free from water as the river steadily rose to a level above the boiler pits. The chief concern was how long could the boilers be operated with safety to keep the electric generators and refrigerating system in action. Also no attempt was made to use purchased power for other than lighting purposes if and when the fires had to be pulled from under the boilers as was the case at 5:30 a.m., with nearly 15 in. of water under the grates. By that time warnings were being sent out that in the face of a steadily rising river the Colfax central power station could be expected to go down with another 3-ft. rise in the river. This level was reached about 4 p.m., Wednesday, March 18.

IN the meantime the gas-driven pump had been put into operation and moved from one location to another in the basement area. With a sufficient supply of gasoline assured to keep it in continuous operation the battle against the incoming waters was kept up until Thursday a.m., when the waters had receded sufficiently to get the boilers back into operation. During these two days the river had risen to the unprecedented official U.S.G.S. level of 46.0 ft., had completely surrounded the plant, and pushed its way a block or more farther up the hill to put 8 ft. of water in the basement of a confectionery plant heretofore considered out of the flood area.

Normally a standby boiler unit but now a silent witness to the inability of a mere boiler fire to cope with the persistent waters of an all-time-record flood.

With the resumption of boiler operation and availability of steam syphon facilities to keep down accumulation of seepage water the pump was shifted to pumping water from the river into the boiler and making available a plentiful supply of steam for use as an aid in drying out the generators so badly needed to get the refrigeration system back into operation.

By directing the flame of blow torches upon steel plates set up as baffles around the generators to direct the currents of heated air onto the generator coils and by setting up steam radiators adjacent to the generators and covering the whole with canvas to make improvised baking-out rooms, the generators were reconditioned so that the smaller one was gotten back into service Thursday evening. The baking out required approximately fifteen hours for the 66 kva. generator. With this generator in commission, work on the 132 kva. machine was not so urgent, hence the blow-torch treatment was dispensed with.

Considering that the boiler room had had between 4½ and 5 ft. of water in it at the height of the flood on Wednesday evening a shutdown of only about twenty hours for the refrigerating system was of surprisingly short duration.

During this shutdown period close supervision and liberal use of locks kept the coolers closed. As the brine cooling system is used the temperatures inside the coolers held without any appreciable rise. Also the demand for meat was so great on Thursday that the fresh meat supply was exhausted by the time the coolers would have begun to warm up. With the return to operation of the refrigerating system, cattle killing and normal plant operations were resumed Thursday evening as soon as safe city water became available for dressing and washing operations.

Present plans of the Peters Packing Co., as protection against another such flood, include the sealing up of the low-lying portions of the boiler room, the establishment of a plant drainage system which will direct seepage and other excess water to collecting sumps or basins from which it can be readily removed by one big and possibly additional smaller portable gas-driven pumps which are to be purchased and kept available for such use.

Willard Howes & Co.

Bringing in the harvest of ripe pods containing the cocoa beans which are obtained by cutting open the pods with a heavy knife as shown in the right hand of the native on the left. Adhering pulp is removed by fermenting in piles covered with plantain leaves.

Raw Material Selection

Basic to Finished Product Quality

Uniform good quality in chocolate and cocoa products is not obtained by accident or by guess. Intelligent selection of the right quality of cocoa beans for the intended use is of first consideration. Skilled handling and processing of the beans prevents deterioration of their inherent qualities and make the most of their economic as well as technological possibilities.

By BENJAMIN J. ZENLEA

Chief Chemist, Rockwood & Co.
Brooklyn, N. Y.

AS WITH other commodities entering into food manufacture the cocoa bean and its products are taken largely as a matter of fact. The average user of these commodities little knows of the expert handling and extreme care required to produce chocolate and cocoa in their various finished forms. Throughout the industry rule-of-thumb methods of manufacture have been gradually giving way to scientific methods.

The origin of the bean, essentially an American product, dates back to pre-historic times and was probably accidentally discovered by the savage Indian tribes roaming the country in quest of food.

It is essentially a tropical product and does not flourish in climates where temperatures drop below 60 deg. F. nor at altitudes more than 1,800 ft. above sea level. Hence the cocoa bean belt comprises the region approximately 20 deg. North and 20 deg. South latitudes, or about 1,000 miles each side of the Equator and cocoa trees are cultivated extensively only in West Africa, Central and South Americas and the West Indies.

The most important cocoa bean producing country today in the world is the Gold Coast Colony of West Africa, the British territory which supplies approximately 40 per cent of the world's annual crop. In South America, Brazil produces about 20 per cent of the world's production. Nigeria, also in West Africa, supplies about 15 per cent. The principal cocoa bean-growing countries of the world in order of 1935 production volume are:*

South America: Brazil, Ecuador, and Venezuela.

Africa: Gold Coast, Nigeria, Ivory Coast, French Cameroon, Fernando Po, San Thomé, Togoland, Belgian Congo, Liberia, Sierra Leone, and Tanganyika.

Central America and West Indies: Santo Domingo, Trinidad and Tobago, Panama, Grenada, Costa Rica. Jamaica, Haiti, Cuba, Martinique-Guadeloupe, and Nicaragua.

East Indies: Ceylon, Netherland India, and Western Samoa.

*Cocoa Department, W. R. Grace & Co., New York, N. Y.

Less important cocoa bean-growing

countries—some of which were formerly of much importance—referred to in literature are:

South America: Surinam (Dutch Guiana), British Guiana, French Guiana, Colombia and Peru.

Africa: Dáhomey, French Equatorial Africa, Angola, Principé, Uganda, Madagascar, and Réunion.

Central America and West Indies: St. Vincent, St. Lucia, Dominica, Honduras, British Honduras. San Salvador, Guatemala, Puerto Rico, and Mexico.

East Indies: Portuguese Timor, New Guinea, Philippines, and New Hebrides.

THE Gold Coast boasts of the most phenomenal growth of cocoa beans of any country. Beginning with an export of 80 lb. in 1891, it exported in 1935 approximately 273,000 metric tons, or about 40 per cent of the world's total annual production. It is stated that in the Gold Coast Colony there are in the neighborhood of approximately 300,000 farms comprising 1,000,000 acres of cocoa trees under cultivation. The average yield per acre per year is put at close to 600 lb. and the average yield per tree per year is 2 lb.

In 1935 the world's consumption of cocoa beans amounted to approximately 645,000 metric tons, while the world's production in the same year amounted to approximately 675,000 metric tons. (Metric ton = 2,204.6 lb. avoir.)

Standard cocoa beans are defined as beans which, while otherwise sound, may be defective to the extent of not more than 8 per cent and slaty to the extent of not more than 10 per cent. Each tolerance is estimated by count. All disputes bearing on the buying and selling of cocoa beans and on their quality are settled by arbitration according to set laws, rules and regulations as determined by the New York Cocoa Exchange, Inc.

The world's market prices for cocoa beans were once controlled in London by weekly auction. Now the New York Cocoa Exchange, which has been functioning since Oct. 1, 1925, plays a very large part in the fixing of world prices. Lots can be traded only through members of the Exchange. The buying is usually done through member brokers and the purchases are in units of 30,000 lb. Each unit is considered as one contract. A great quantity is bought in this manner for future delivery. The daily minimum fluctuation permitted per pound is one-hundredth of a cent, or $3 per contract. The maximum fluctuation per day is 100 points, or 1 cent per pound; $300 per contract.

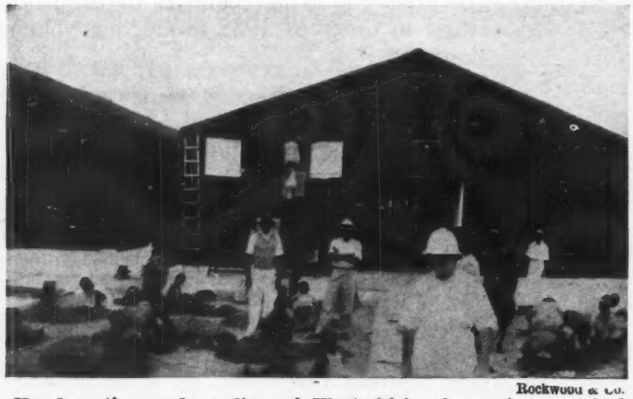
Mian crop accra, bahia, fine San Thomé, and Main Crop Ivory Coast are considered standard growths and are deliverable to the buyer without premiums except for grade. The delivery of cocoa beans is made from warehouses licensed in the port of New York by the New York Cocoa Exchange, Inc., in standard jute shipping bags bearing identification markings customary to designate the growth origin of the beans. To fill a contract, delivery may be made on the growth of cocoa of any country or clime.

The prices for standard growth, with deductions and additions, are made for other growths and grades according to the rates of exchange. Certain beans are prized for their chocolate quality and flavor and sell for a much higher price than the standard growth; Samoa and Java beans sell at a premium of from 8 to 12 cents per lb.; Trinidad at approximately 7 cents a lb.; Guayaquils, which include summer Arribas, season Arribas, and Machalas, at about 6½ to 9 cents per lb. These premium beans are seldom, if ever, tendered for delivery in lieu of standard growth beans.

BECAUSE of the delicate flavor and the ease with which this delicate flavor can be affected by wrong handling, cocoa beans must be carefully inspected before use. Their quality is judged collectively by the grower, packer, shipper, Departments of Agriculture from the countries exporting and importing the beans, brokers and Cocoa Exchange, as well as the chemist and buyer experts of the concern in whose factory the beans are to be processed into various choco-

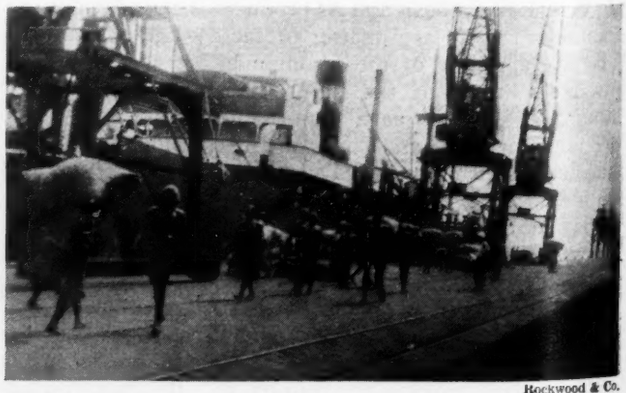
Rockwood & Co.

Loading cocoa beans onto steamers from surf boats off the west coast of Africa. Sometimes the waves of a rough sea wet the bags and lead to moldiness during shipment and storage.



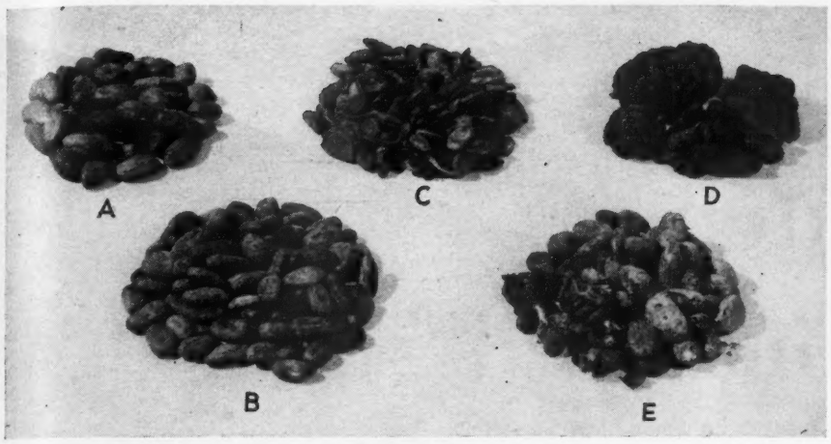
Rockwood & Co.

Hand sorting and grading of West Africa beans in a central compound after curing by fermentation and drying and preliminary to bagging for shipment.



Rockwood & Co.

Natives of both sexes bringing bags of beans onto the wharf of a Gold Coast African seaport for loading onto steamer by modern movable hoisting machinery.



A: Superior grade of properly cured cocoa beans which sell at a premium price . . . B: A good grade of a popular cocoa bean. Note that these beans have a greater variation in size and shape than those shown in A . . . C: Flat and shriveled beans removed from commercial lots during the mechanical cleaning operation at the chocolate and cocoa manufacturing plant . . . D: Clumps of beans resulting from improper or lack of fermentation to remove pulp. The large clump is from an unripe or immature pod . . . E: Presence of a small per cent of badly molded or cocoa-moth infested beans is enough to impart an objectionable odor and flavor to products made from them. More than 5 per cent moldy beans in a lot will degrade that lot into the inedible classsification of the Federal Pure Food Act.

late and cocoa products. The buyer of the beans is concerned primarily with two types of cocoa beans: (1) those used for cocoa butter expression and (2) those used for the manufacture of high quality products.

Cocoa beans used for cocoa butter pressing must first of all be sound and free from unnatural flavors and odors which may deleteriously affect the quality of the cocoa butter. Beans which would not ordinarily produce a good chocolate or cocoa may nevertheless produce a good quality cocoa butter, because of the insolubility of the cocoa mass solids in cocoa butter.

Price is an important consideration in the purchase of cocoa beans for cocoa butter expression, and the right price to pay for cocoa beans can be arrived at only by a study of the various factors which must be considered. The most important factor is the quantity of cocoa butter which can be obtained from a given lot of beans. This can be judged only by careful chemical analysis of such qualities as the percentage of moisture, shell, and fat content. The percentage of byproduct offal is also important. Cocoa beans deficient in fat and high in shell and moisture content will give a relatively low yield of butter, a relatively high yield of waste or byproduct offal, and a greater amount of breakage during handling. The percentage of waste can best be determined by checking closely the percentage of extraneous substances obtained on cleaning the beans, the mechanical losses in conveying and roasting the beans, and the relative percentage of cocoa germs, cocoa dust, cocoa fines, cocoa shells, and clean nibs obtained. From this point in the processing of the cocoa bean the amount of butter which can be obtained from the nibs will depend greatly on the fineness of milling, temperature of the chocolate liquor, amount of pressure, and time of application of the pressure. Also the condition of the filter fabric and the resistance that these fabrics offer to the passage of cocoa butter through them play an appreciable part in the separation of the cocoa butter from the cocoa mass.

From the consideration of these factors, it can be seen that the cheapest type of cocoa beans may sometimes be the most expensive and conversely the expensive type of beans may be cheapest in the long run. As an example, the main-crop and the mid-crop of Accra beans may be cited. The main-crop beans contain, on an average, 46 per cent cocoa butter, 5½ per cent moisture, and 11 per cent shell and yield a chocolate liquor containing approximately 55 per cent cocoa butter. The mid-crop beans contain, on an average, 41½ per cent cocoa butter, 5¾ per cent moisture, 14 per cent shells and yield a chocolate liquor containing approximately 51 per cent cocoa butter. In addition, they are more difficult to process.

In buying cocoa beans of a better grade for the manufacture of high quality products, the percentage of the shell, moisture, and cocoa butter are only of minor importance, as the problem is not one of cocoa butter expression, but that of obtaining and preserving the delicate and characteristic flavors contained in the beans. It is not to be inferred that the moisture content is of no importance; it is of importance to the extent that it may be excessive and thereby encourage mold growth. In efforts to discourage the importation of moldy, wormy, and defective cocoa beans, the United States Department of Agriculture restricts the tolerance limit for moldy and wormy beans to not more than 10 per cent, of which not over one-half—5 per cent—shall be moldy. This order went into effect October 1, 1933. Beans containing larger quantities than those given are considered to be adulterated under the Federal Pure Food Act because they "consist in whole or in part of a filthy, decomposed or putrid animal or vegetable substance." Moldiness can be largely controlled.

The quality of cocoa beans is determined by splitting 100 cocoa beans with a pen-knife and subjecting them to a visual examination. The moldy cocoa beans are recognized by the yellowish or greenish patches of coloring matter which are composed of small round balls called spores and hair-like filaments known as hyphæ and are grouped together. Wormy beans are then grouped together as identified by the presence of worm excreta. Moldy and wormy beans are classed as defective; a 5 to 10 per cent content is sufficient to degrade the beans to second grade quality.

Slaty colored beans are caused by imperfect fermentation. Such beans do not yield a chocolate of as good flavor and color as the full-fermented beans because of the incomplete development of the flavor constituents. These beans are also characterized by a bitter and harsh flavor. Slaty beans, however, can be used for cocoa butter pressing as the cocoa butter obtained from such beans has been found to be quite normal. However, if the percentage of moldy or wormy beans is above the average, an "off-flavor" will be imparted.

Cocoa beans are also examined for flavor and are classified as undesirable if they possess such flavors as strong vinegar, ham-fat, cheese or smoke. The vinegar and cheese flavors are the result of imperfect fermentation caused either by excess or insufficient oxygen. Incomplete or excessive oxidation is conducive to

(Turn to page 265)

Controlling Serial Batch Operations

By MICHEL P. VUCASSOVICH
Food Technologist
Gorton-Pew Fisheries
Gloucester, Mass.

Fig. 1. First weighing of potatoes to be trimmed ("eyed").

Fig. 2. Second weighing of trimmed potatoes. The checking clerk behind the scale records the weight on the trimmer's ticket.

A SIMPLE method of controlling the weight of several ingredients is employed by Gorton-Pew Fisheries Co., in its canning department. Ready to Fry codfish cake is made of a mixture of potatoes, codfish, shortening and spices which must be prepared, mixed in a batch mixer and dumped into a filling machine at a rate sufficient to keep the canning line in continuous operation at the rate of 106 No. 307x208 cans per minute.

Certain problems connected with maintenance of quality necessitate that the batches follow one another with promptness and regularity. Chief of these problems is the well known ability of the color of raw potato to turn dark soon after a cut surface is exposed to air. The oxidase causing this darkening can easily be destroyed by heat, but it has been regarded as essential in this plant that the potatoes be peeled before instead of after boiling. Hence it is necessary to adjust the operations to a speed that will permit cut raw potatoes to be handled without discoloration.

Associated with the serial batch mixing problem is the matter of keeping account of payment for the piece-

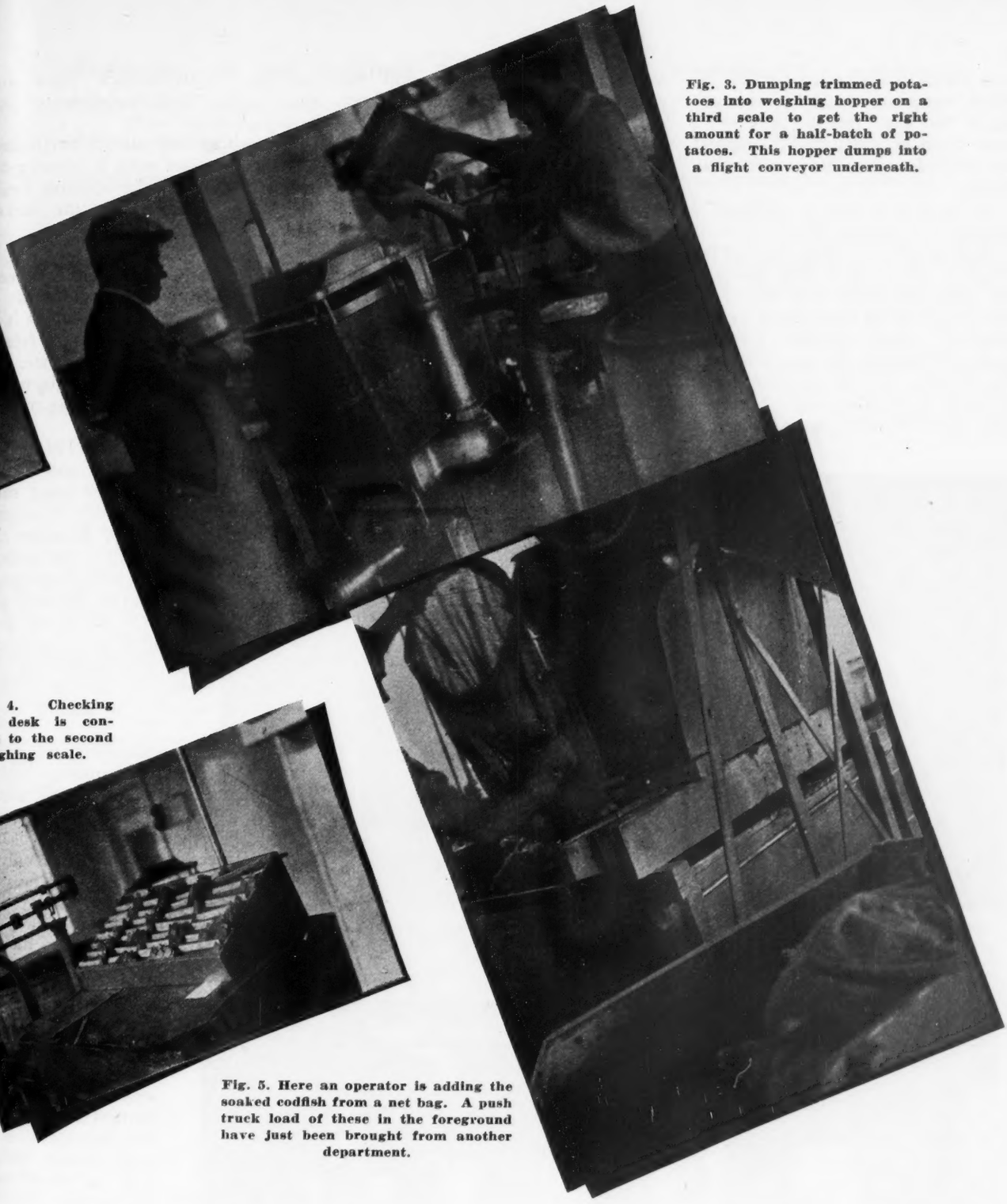


Fig. 3. Dumping trimmed potatoes into weighing hopper on a third scale to get the right amount for a half-batch of potatoes. This hopper dumps into a flight conveyor underneath.

Fig. 4. Checking clerks' desk is convenient to the second weighing scale.

Fig. 5. Here an operator is adding the soaked codfish from a net bag. A push truck load of these in the foreground have just been brought from another department.

work operation of trimming the potatoes.

Trimming or "eyeing" as it is called at Gorton-Pew is carried out by female workers at a traveling table of the type known in the vegetable canning industry as a "merry-go-round." Raw potatoes are first run through a mechanical abrasive vegetable peeler that removes the skins from all but the eyes and low spots. In this stage they are peeled but not trimmed. The depressions known as eyes still remain to be removed. The peeled potatoes are elevated by conveyor to a hopper equipped with a hand-operated gate which discharges at a convenient height above the level of the merry-go-round. Below the hopper is a small platform scale of 50 lb. capacity on which a man weighs exactly 16 lb. of potatoes into each pail. These in turn are put upon the merry-go-round which carries them to the several trimmers.

WHEN potatoes are running very smooth and require but little trimming, the number of trimmers needed is small, but when the potatoes are very rough, the number may run as high as 35. Payment for this work

is at the rate of 40 cents per 100 lb., which makes for an hourly compensation that may run as high as 75 cents per hour when smooth potatoes are available. But this is rather unusual.

As soon as a pail of potatoes is trimmed the operator places on its top a small cardboard ticket bearing her number. The pail is then placed on the merry-go-round and travels to the far end of the room where a check weigher, using another platform scale, determines the net weight of the contents. On the opposite side of the scale is a clerk's desk. The clerk lifts the trimmer's ticket from the pail, records its number and the weight of trimmed potatoes. From the fact that each trimmer receives exactly 16 lb. of potatoes it is possible to determine the trimming losses. And it is possible to identify those trimmers who have trimming losses higher than average and instruct them how to meet the average figure.

The check weigher then dumps the trimmed potatoes into a hopper scale with a dump bottom that holds half of the total amount for a batch. Whenever all is in readiness he pulls the slide and permits the potatoes to fall to an elevating conveyor that discharges them into a vertical slicing machine. Quarter-inch slices are made. Two 97-lb. weighings of potatoes go into a batch.

The slices fall into a perforated aluminum basket with a capacity of about 200 lb. and the operator feeds the soaked codfish into the basket from the side.

Adding shortening to the ingredients in the mixer. When mixing is completed the batch is dumped through hopper to the filling and canning line on the floor below.

Trimmers at work cutting the eyes out of potatoes that have already gone through an abrasive peeler.

THE codfish ingredient has been previously weighed dry into a coarse mesh textile bag in which it is then soaked until the fish are freshened. A push truck load of these net bags of freshened cod stands ready alongside the slicer. One bag of fish goes to a batch.

The formula calls for 194 lb. of peeled trimmed potatoes and 97 lb. of dry codfish, the latter being subsequently freshened and of course weighing more than 97 lb. after absorbing water. In filling the baskets for cooking, the procedure is to run a 97-lb. batch of potatoes through the slicer then add the 97 lb. of fish, and next the remaining 97 lb. of potatoes. Such a charge will almost fill the aluminum basket and there is no likelihood of an error in adding these ingredients.

It should be explained at this point that the perforated aluminum basket stands in a tank of cold fresh water under the slicer to keep the potatoes submerged, thereby to prevent blackening. Here they remain for only a 'minute or two until they are hoisted into a kettle of boiling water for cooking. When that operation is complete, as determined by timing, the perforated basket is hoisted, allowed to drain and then dumped through a bottom opening into a sausage grinder which in turn discharges into a double arm horizontal type slow - speed mixer such as many bakeries employ.

Into the mixer goes the weighed portions of spices and shortening to complete the batch.

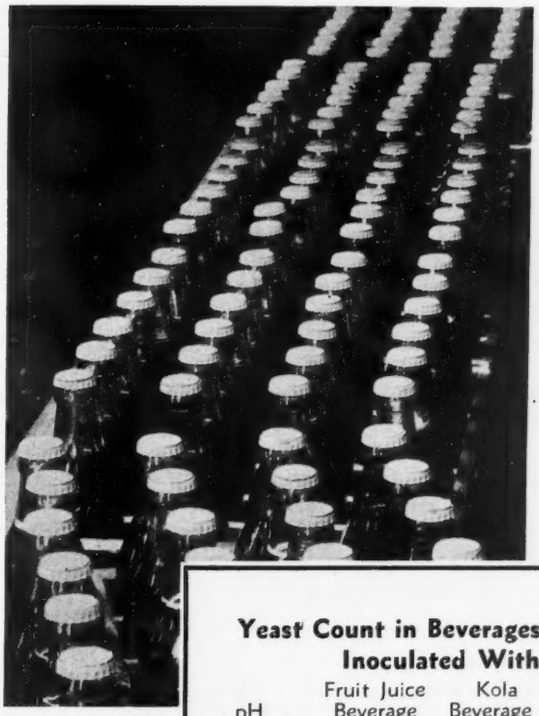
As soon as the proper interval of mixing time is completed the batch is dumped into the hopper of the filling machine from which it goes through the canning line.

Reduction of the original acid content of beverages by alkaline ingredient water may impair protective power of the acid and permit development of sour taste and disagreeable odor. Fruit juice beverages are particularly susceptible to microorganism growths.

Alkalinity Control of Ingredient Water

Reduces Spoilage in Carbonated Beverages

By H. BUTTLER
Chief Chemist, Dr. Pepper Co., Dallas, Texas



WHY some plants consistently had spoilage in their bottled carbonated beverages while other plants did not puzzled me greatly when I first had the ingredient water in two hundred and fifty different bottling plants to worry about. My previous job involved the use of only one water, which was a very good bottling water.

My first thought, of course, was that the bottlers who were having spoilage did not bottle in a clean and sanitary manner. Upon investigation that was found not always to be the case. Some exceptionally clean bottling plants had spoilage regularly whereas some seemingly very insanitary plants never had any spoilage from yeast or bacteria.

Our attention then turned to the water itself. Even though articles published on what constitutes a good bottling water either did not mention the alkalinity of the water or touched upon it very lightly, we decided to determine the pH of the beverages from all the bottling plants and find out what variations we had. Experiences in trying to grow yeast, also bacteria, in the past had taught us the definite effect that the pH value of a solution had on the growth of these microorganisms. As might be expected, we found a great variation in the pH of the beverages; in fact a variation of from 2.9 at the plants where distilled water was used to a pH of 5.0 where the water had a high alkalinity.

"pH value" indicates the strength of the acid or alkali; not the weight or percentage. The same percentage of different acids in solution give different pH values, e.g.: phosphoric acid, pH 2.4; citric acid, pH 3.1; tartaric acid, pH 3.5. When alkaline salts are added to the solutions the pH value of each increases; acidity decreases.

Upon comparing the keeping quality of each beverage with its pH value we found, practically without exception, that the spoilage was in the beverage with the highest pH. This evidence indicated that where the original acidity of the syrup had been partially neutralized by the alkalinity of the water, the preservative power of the original acid content had been lowered.

Taking a tip from the results of these preliminary tests we immedi-

Yeast Count in Beverages on Standing Ten Days After Being Inoculated With Wild Yeast, 164 Per cc.

pH	Fruit Juice Beverage	Kola Beverage	Ginger Ale	Lemon	Grape	Sarsaparilla
2.9	2	18	9	—	—	—
3.2	5	10	12	2	—	—
3.4	30	8	6	29	21	—
3.6	510	10	20	24	12	4
3.8	18,800	11	160	79	8	13
4.0	91,000	18	6,600	2	17	24
4.5	80,000	22	9,000	26	2	1,232

ately ran a series of experiments on the beverages in which the pH was regulated by the addition of alkali from a value of 3.0 to 4 5. To each bottle of this series, we added the same amount of wild yeasts from a bottle of beverage which was already sour. It might be well to mention that yeast—at least the wild yeast in which we are most interested—does not cause an alcoholic fermentation in the finished carbonated beverage; probably because of a lack of the proper nitrogen compounds necessary for the normal propagation of yeast. Spoilage produces a very disagreeable sour taste and odor.

THE result of this experiment on different beverages is given in the accompanying table which shows that the fruit juice beverage, ginger ale and sarsaparilla have a pH above which the yeasts tend to multiply and below which the yeasts tend to decrease; whereas, the kola, lemon and grape drinks show no such point within the range of the experiment. It is well known that yeasts need something other than sugar for growth, such as nitrogen, phosphorus and other minerals. Consequently, we may assume that yeasts grow best in the beverage containing the most natural fruit juice and grow least in the beverage containing only distilled oils. Another cause for the difference in growth may be that some oils have a retarding effect but any of the oils added are in such low concentration in the finished beverage that the effect would be nearly negligible.

These results, of course, would not hold if the bottles were improperly sterilized or if the operations in the plant permitted a high degree of pollution to be picked up. In other words, just because a bottler has water of low alkalinity does not mean that he should be careless or insanitary.

Of course, all the above drinks contain a different amount of acid or a different kind of acid and do not show the same pH when bottled with water of the same alkalinity. For instance, when the alkalinity in bottling water is 280 parts per million, it makes a pH of 4.0 in the fruit juice beverage. The same water took 310 parts per million total alkalinity to make a pH of 4.0 in the kola beverage; 495 parts per million total alkalinity to make a pH of 4.0 in the ginger ale; 50 parts per million alkalinity to make a pH of 4.0 in the sarsaparilla; 235 parts per million total alkalinity to make a pH of 4.0 in the lemon; and 590 parts per million total alkalinity to make a pH of 4.0 in the grape.

From these data it can be seen that beverages of a low acidity such as sarsaparilla, root beer and cream soda will be actually neutralized by the relatively small amount of alkalinity and, therefore, will be more often found spoiled. Most bacteria, as well as yeasts, will grow at a pH of 7.0. All these experiments were made under 3.5 volumes of carbon dioxide.

ON THE basis of this work we believe that alkalinity is one of the most important if not the first consideration in judging bottling water, particularly as beverages made from the true fruit juices appear to be growing in popularity. The alkalinity of drinking water can be reduced by distillation, by the addition of hydrated lime or by the addition of a strong acid. Distillation is the most expensive but where water has high dissolved solids, it is necessary to eliminate the saline taste as well as the alkalinity. Acid treatment is very difficult to handle in an ordinary bottling plant and increases the salts in a water which is usually already fairly high in dissolved salts. Hydrated lime, therefore, is used to precipitate out the alkalinity as calcium carbonate or magnesium hydroxide. This can be done either by the batch process or by the continuous process with the automatic addition of chemicals as the water is used. While the first cost of the latter process is higher, we found it much more satisfactory.

If the alkalinity is caused by sodium bicarbonate, then calcium chloride is used to make the precipitation of calcium carbonate possible.

It is necessary, if water is being treated to reduce the alkalinity, to add a chlorine compound to produce one or two parts per million of chlorine, so that the bacteria will not multiply in the tank of treated water. Only an activated carbon purifier after the sand filter is necessary to take out all the excess chlorine.

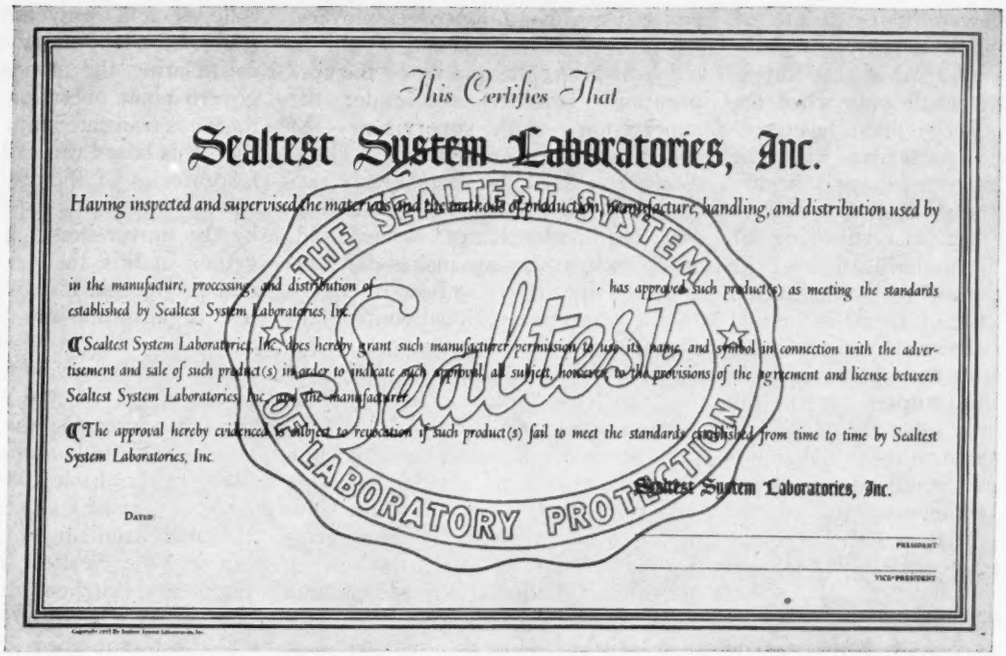
We have found from putting this experimental work into factory practice during the last three years that spoilage has been eliminated from every one of the plants which now treat their water accurately to reduce the alkalinity below 100 parts per million. Of course when the bottling plant eliminates all spoilage, sales immediately begin to increase.

Coffee Staling

A letter to the Editor of FOOD INDUSTRIES

IN THE April, 1936, number of FOOD INDUSTRIES, I have read the comments made by Dr. Punnett ("Coffee Staling IS Preventable") relative to the popular abstract of the paper delivered by me at the San Francisco meeting of the American Chemical Society which appeared in your October, 1935, issue.

I would suggest that those who are interested read my complete technical report, which was published in the March, 1936, issue of *Industrial and Engineering Chemistry*, pages 290-293. Full details are given in this report, together with the results of the scientific work which was executed. Dr. Punnett's comments have been adequately and fully covered in this paper.—R. O. BENGIS, *Department of Chemistry, Yale University, New Haven, Conn.*



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Sealtest System Laboratories, Inc.

Dated

President

Vice-President

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Putting Food Manufacture on a

Merit System Basis

By J. H. SHRADER

Secretary, Sealtest System Laboratories, Inc., New York, N. Y.

SETTING UP of an organized merit system in the divisions of the National Dairy Products Corporation during the past year is an unusual venture in centralized control of food research and quality production.

In its corporate form the system is known as the Sealtest System Laboratories, Inc. It is comprised of the 206 laboratories of the National Dairy Products Corporation engaged in research, experimentation, and plant control work. In operation the system plans and coordinates fundamental and applied research on problems of the dairy industry; takes charge of plant operations to attain and maintain a standardization of manufacturing procedure and of product quality; and sponsors merchandising practices which will give the corporation's products a wider consumer acceptance.

In its functional form the system maintains two master laboratories, eleven regional control laboratories, 50 field laboratories, and 143 plant laboratories. One master laboratory at Chicago carries on the fundamental research work on cheese and cheese products. The other, at Baltimore, gives particular attention to milk and ice cream. Work on butter is assigned to a special, but not a master, laboratory at Danville, Ill. In such strategical points as Baltimore, Chicago, Cleveland, Danville, Detroit, Milwaukee, New York City, Philadelphia, Pittsburgh, Schenectady, and Washington, D. C., are located the regional control laboratories which through the field and plant laboratories in their zones integrate technical knowledge into and exercise supervisory control over all phases of production in the plants licensed to operate under the Sealtest System.

THROUGH the licensing of plants which can operate under the system comes the direct application of the merit system. Only those plants in which the raw materials, manufacturing procedure, and methods of preparing the product for market measure up to the Sealtest standards are eligible for the award of a Sealtest certificate of merit similar to that shown with this article.

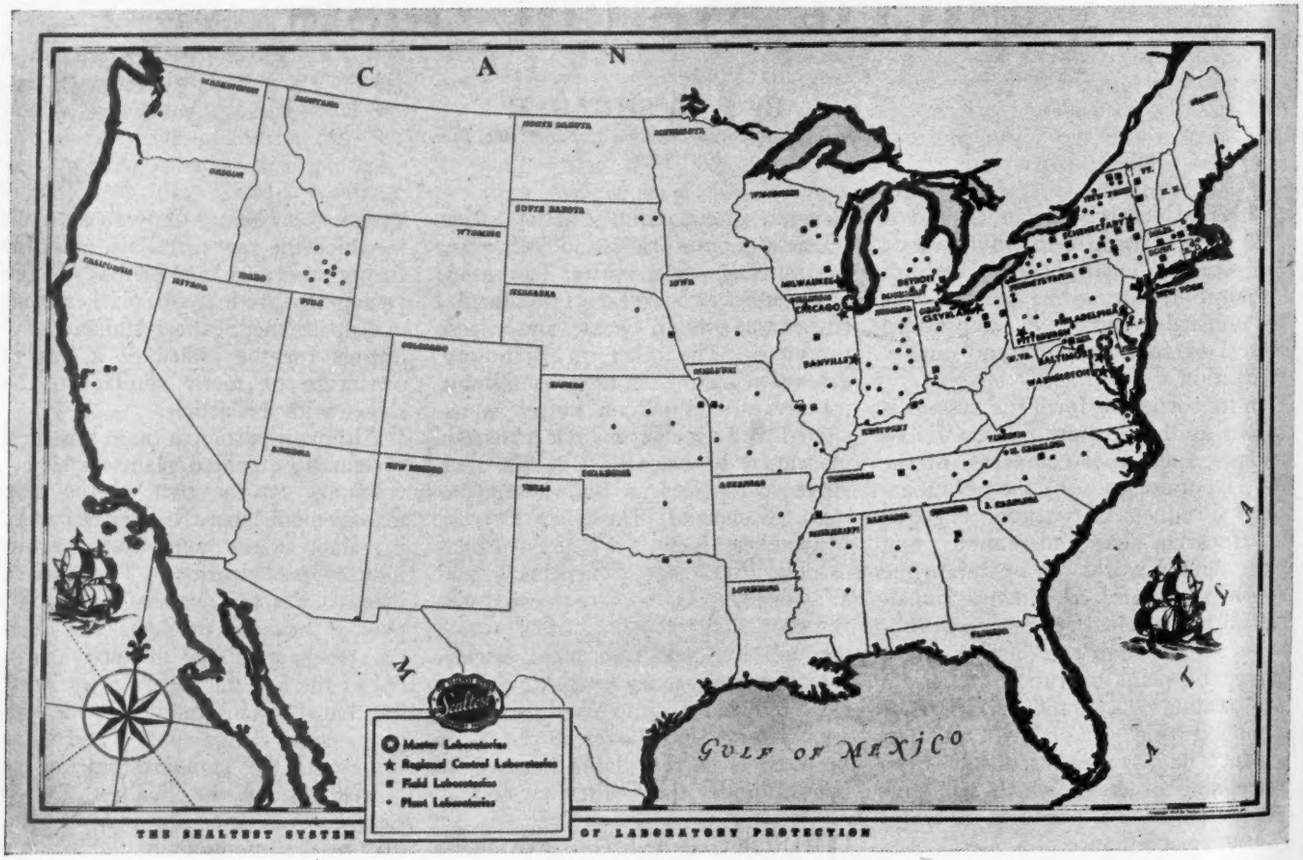
Although participation in this merit system by qualified plants is strictly voluntary on the part of the plant management, there is a merchandising slant to the merit system which induces participation. This inducement is the privilege of having the plant's packaged products and delivery trucks bear the distinctive symbol of the Sealtest laboratories attesting that the plant and its products are under supervisory control and measure up to the standard practice requirements of the Sealtest System Laboratories, Inc. No matter what may be the intentions of the management of the operating plant, use of this symbol is not permitted until the

plant has received its certificate of merit from the Sealtest System Laboratories, Inc. Award of this certificate of merit is made only when the management of the plant has compiled in every particular with the provisions of agreement and license stipulated by the Sealtest System Laboratories, Inc. Conditioning of the plant and standardization of its products to warrant the authorization of the certificate of merit is carried on under the supervision of the Sealtest Laboratories and at the expense of the operating company owning the plant. Not only must the plant and its products measure up to the standards set, these standards must be maintained. Otherwise loss of the certificate of merit and the privilege of using the Sealtest symbol will result.

Not only does the laboratory staff serving the particular plant pass on the quality of the raw materials used, the type of equipment installed, the manufacturing procedure followed, the manner and method of packaging and distribution employed, but also upon matters pertaining to source of supply for ingredient materials, plant and equipment sanitation, and health and physical condition of employees. In fact all factors which would in any way affect the quality of the corporation's products are under the supervision — daily supervision — of the Sealtest Laboratories. A local Sealtest official is permanently assigned to each plant to see that Sealtest requirements are carried out. Each such supervisor makes daily reports to the Sealtest officer in charge of the respective regional control laboratory and the latter reports regularly to the central administrative office in New York. Field men from headquarters regularly visit all the laboratories and plants to check on the maintenance of standards and to bring information helpful to the solution of local problems. Through this procedure the system functions to make the combined knowledge and experience of all its members promptly available at any point at any time.

THE work of the Sealtest system is not devoted solely to supervision of production processes. An advisory board, consisting of eleven scientists, expert in the dairy product field and members of the staffs of leading colleges and universities, aids the staff of the laboratory organization in formulating the standards set up to govern plant operation. In this way theory is translated into practice. Further, this board can call on the master laboratories of the system for aid in solving research projects undertaken by the universities. By working together in this fashion, the scientists and production men within the Sealtest organization are able to perfect improvements in daily production practice and contribute to the general advancement of the dairy industry through increasing the knowledge of the value of milk, and developing new uses for this basic food.

As a part of its program to aid in the merchandising of the products bearing the Sealtest symbol an experimental kitchen under the directorship of a well-known nutritionist has been equipped in Radio City, New York City. In this kitchen will be worked out recipes and diets built around dairy products. This kitchen will also be under the supervision of the research staff of Sealtest Laboratories, Inc. In this manner research results and kitchen practice will be integrated.



Integral units of the Sealtest System Laboratories, Inc., are situated throughout the United States to be convenient to the plants they serve.

Automatic Control of

Batch-Process Temperature

A UNIT OPERATION OF FOOD ENGINEERING

Controlling

► Temperature control of batch processes is, perhaps, the most used and the most useful controlling method available to the food industries. Many bakeries, breweries, canning plants, confectionery plants, dairies, packing plants and others obtain greater production of better quality products at less cost through its use. Many other food plants that should use such controls do not, and the simple explanation here given of the equipment available and its application will indicate how they can profit from it.—Editor.

This is No. 3 of a series on the unit operations of food engineering.

MANY food plants are equipped with instruments for controlling automatically the temperatures in batch processes. Managers of these plants have installed automatic control through no love for gadgets. Instead, they have an eye for increased profits, which they realize by eliminating or greatly curtailing spoilage, improving quality, reducing shrinkage, producing a more uniform product, reducing fuel consumption and freeing workers for other tasks. Nor do these instrument-minded processors forget that automatic control, together with recording of temperature, affords protection against claims of dishonest consumers who would collect damages for alleged injuries resulting from improperly processed foods.

Two general types of controls are being satisfactorily applied to this task of automatically regulating temperatures — self-acting and power-operated. Both of these, of course, utilize a sensitive, or temperature "measuring" element, corresponding to the bulb of a thermometer, which responds to the process temperature.

THE types of sensitive elements employed include liquid, gas, vapor-pressure (volatile liquid), solid, resistance thermometers and thermocouples. In the first three, the fluid usually is contained in a metal bulb connected through a capillary (small-bore) tube to an expansion unit, which in power-operated controllers, ordinarily is a pressure spring (a curve, spiral or helix of flattened tubing which tends to uncoil when the pressure inside it increases through expansion of the sensitive fluid). The ordinary self-acting unit, however, uses in place of the pressure spring a metal bellows mounted on the valve stem, this bellows expanding and actuating the valve against the pressure of a spring when the sensitive fluid expands. A bellows also is used as the expansion unit in some power controllers.

Fluid-filled sensitive elements may contain mercury, alcohol or ether (liquid type), nitrogen (gas type) or sulphur dioxide, ether and so forth (vapor type).

The temperature ranges for which these fluid-filled elements are suitable are said to be —20 to 650 deg. F. for vapor-pressure, —80 to 1,000 for gas and —40 to 1,000 for mercury.

The solid type of sensitive element consists of two substances, one of which expands more than the other when heated. Forms of this comprise the bimetallic spiral or helix which tends to uncoil when the temperature rises and the bimetallic disk which snaps into convex shape. Another form, often used in industrial controllers, consists of a rod inside of a pipe, one element expanding and the other remaining practically fixed in length with a rise in temperature to operate a valve or to make or break contacts in an electrical circuit.

Resistance thermometers consist of a coil of wire connected in one "arm" of a Wheatstone bridge circuit, their electrical resistance increasing and the current flowing through them decreasing as the temperature rises. Variation in the flow of current acts to deflect the pointer of a galvanometer connected across the bridge, which deflection indirectly actuates the control.

The thermocouple consists of two dissimilar metals connected at the ends to form a loop, one junction being exposed to the temperature of the process, the other to room temperature. The temperature difference at the two junctions sets up an electrical potential which is proportional to this difference, hence a measure of the temperature at the hot junction. The cold junction of the thermocouple is connected to a potentiometer so as to deflect a galvanometer and effect control. Both the resistance thermometer and thermocouple controllers are

suitable for high temperatures and they have a high sensitivity.

Self-acting regulators low in cost because they dispense with the intermediary power system, find wide usage in food plants. They frequently are of the vapor-pressure type, such as shown in Fig. 1, although mercury and gas sensitive elements also may be employed. Self-acting controls also are made with sensitive elements of bimetallic or metal-and-carbon construction, the differential in expansion being multiplied through a linkage to the valve. In another self-acting controller, a liquid-expansion sensitive element is contained inside the valve housing itself and is directly connected to the valve plug. This unit, of course, controls the flow of a medium passing through the valve according to the temperature of that medium and not according to the temperature of a process at a more remote point. It is quite low in cost and reasonably accurate. Most self-acting controllers are adjustable, one type having a remote-dial adjustment. They are recommended by one manufacturer for temperatures up to 280 deg. F.

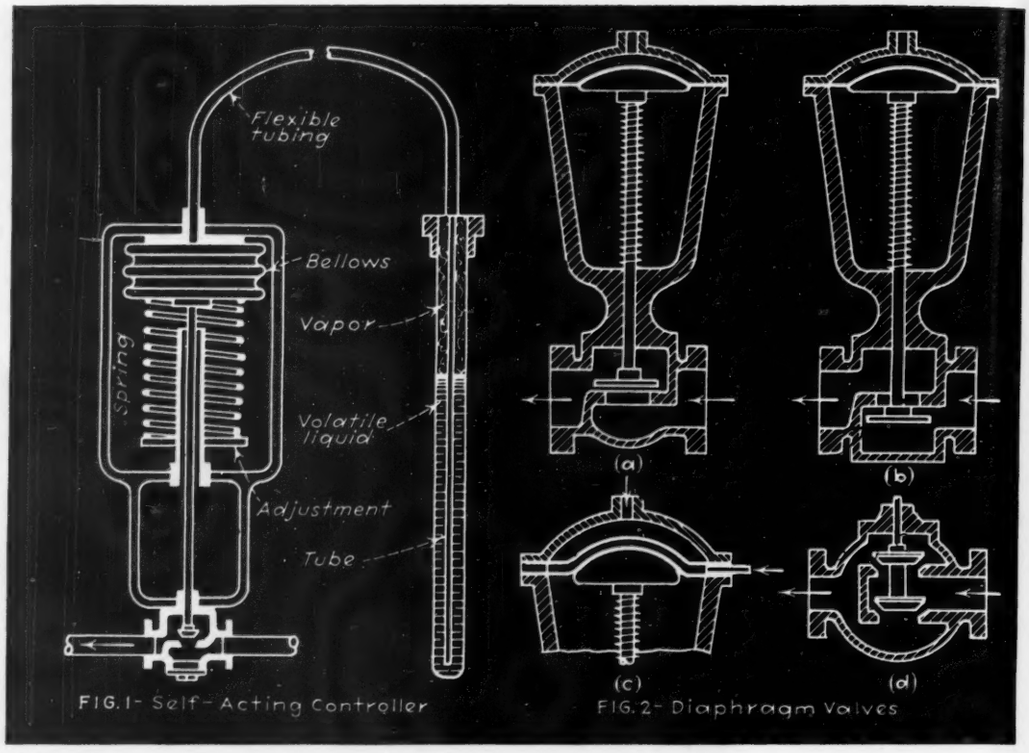


FIG. 1- Self-Acting Controller

FIG. 2- Diaphragm Valves

In addition to low initial cost, self-acting regulators have the advantages of being easily installed, of requiring no auxiliary equipment such as air-compressors and air lines and of needing little maintenance. For many applications, they are entirely satisfactory, especially where temperature fluctuations are not great and where very close control is not essential However, the opening and closing of the valve with this type of control is gradual, a disadvantage in some applications, since the cut-off cannot be sharp and since more time may be required to bring the batch up to temperature. As an example, ten minutes may be added to the time required to heat a retort of canned food to the processing point. But this objection often is overcome with a by-pass manual control until the desired temperature has been attained.

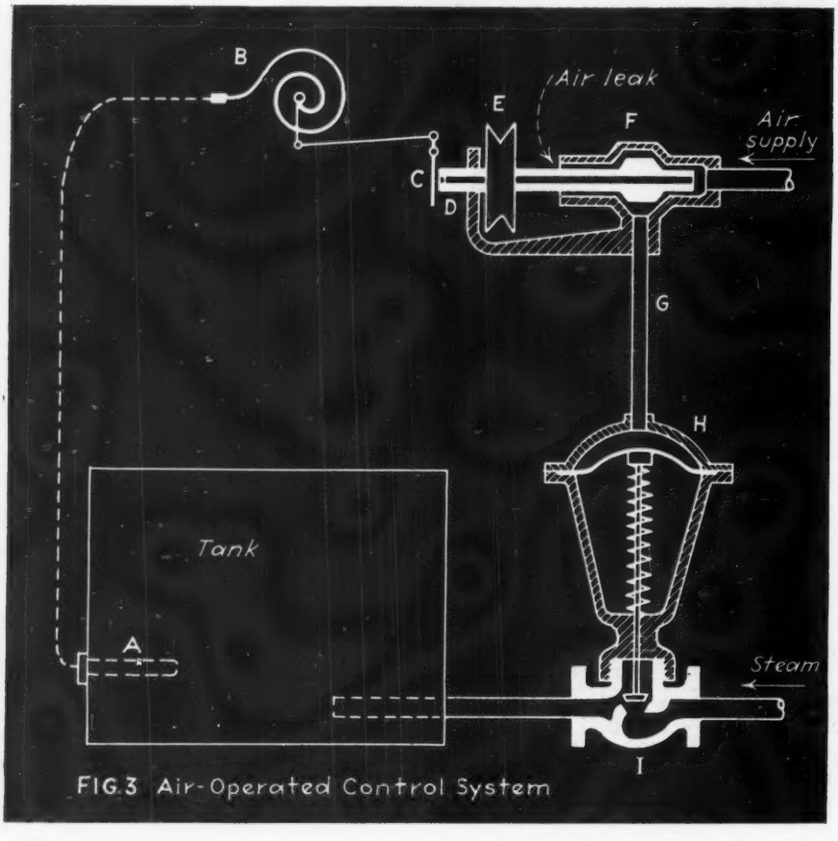


FIG. 3 Air-Operated Control System

CONTROLLING systems for applying power to valve opening and closing mechanisms in response to action of the sensitive element are of two types—fluid and electric. The former usually are of the air type, although steam, water, oil and gas have been employed. In this type of control, air pressure is made to act upon a diaphragm mounted on the valve stem, thus closing or opening the valve (according to whether it is direct or reverse acting) against the pressure of a spring. Liquid, gas or vapor-pressure sensitive elements commonly are employed to control

the flow of air with this type of control, although the differential-solid-expansion element also is used. With any of the first three mentioned, movement of the free end of the pressure spring or other expansion unit actuates a pilot valve. The end of the pressure spring may be connected mechanically to the pilot valve, or it may be linked to a flapper which regulates pressure in an air bellows which moves the pilot valve. Fig. 3 shows the complete cycle of operation of the air-control system of the latter type. As the temperature in the tank increases, fluid in bulb (A) expands causing pressure spring (B) to uncoil a small amount, moving flap (C) away from the nozzle (D), decreasing pressure in the expansion element (E), moving pilot valve (F) in to the left to increase the flow of air through line (G) to diaphragm (H), depressing it to close valve (I) and shut off the flow of steam to the tank. As the temperature drops, the reverse action will take place to open the steam valve.

Pilot valves may be either of the open-and-shut or throttling types, the former being most generally employed in systems such as described above, where an intermediate air relay gives a large movement of the pilot valve for a small movement of the expansion element. Pilot valves may be either direct or reverse acting.

Various auxiliary devices have been added to the pilot-valve control mechanism to maintain a more even process temperature under rapid or unusually large heat-load changes. The customary application of these refinements, however, is in continuous process control. The air type of controlling instruments also are built with convenient adjustments for altering the control point. Sometimes they have a sensitivity adjustment, too. These features contribute to flexibility.

Compressed-air control instruments are made in non-indicating, indicating and recording types. In the last, a clock or synchronous motor rotates a chart under a pen which is positioned by the pressure spring of the sensitive element. This type lends itself to time-cycle control of temperature. A sheet-metal cam, corresponding in form to the temperature schedule required and driven by a clock or synchronous motor, shifts the control range just as the best operator would do if he were continuously on the job and alert. These time-cycle cams can be cut by the plant superintendent with recorder charts as patterns.

FIG. 2 shows various types of diaphragm valves used with compressed-air controllers. These may be designed for direct action (*a*) and (*d*), for reverse action (*b*), in the balanced type (*d*) and for two function control (*c*). Any of these valves can be made to give throttling control by using a throttling pilot valve, although the reverse acting type of globe valve at (*b*) will throttle only in small sizes. All will function as

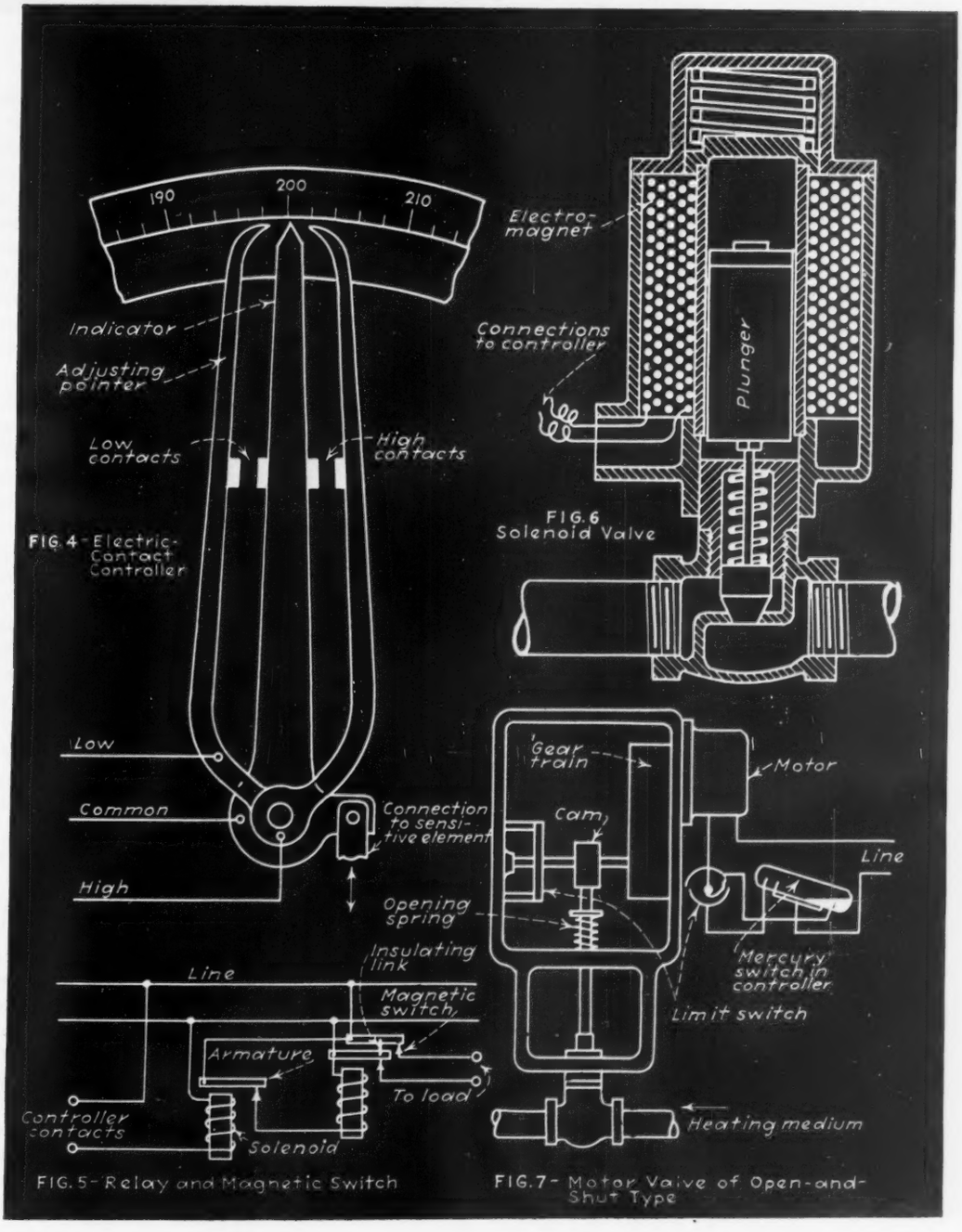


FIG. 4 - Electric-Contact Controller

FIG. 6 Solenoid Valve

FIG. 5 - Relay and Magnetic Switch

FIG. 7 - Motor Valve of Open-and-Shut Type

open-and-shut valve with a non-throttling air valve. The globe valves are intended for medium pressures and the balanced for high pressures, while butterfly valves are for low-pressure gas or air.

In batch-process temperature control, it may be said in general that open-and-shut types of valves can be employed because of the high-heat storing capacity of the process. If, however, there is an appreciable lag between the time heat is applied and the time it affects the controller, the process might become overheated before the valve was closed. So under those circumstances throttling control would be required. Drying may demand throttling control because of the unfavorable ratio between the heat storing capacity of the process and the possible heat demand, and also on account of difficulty in locating the sensitive bulb.

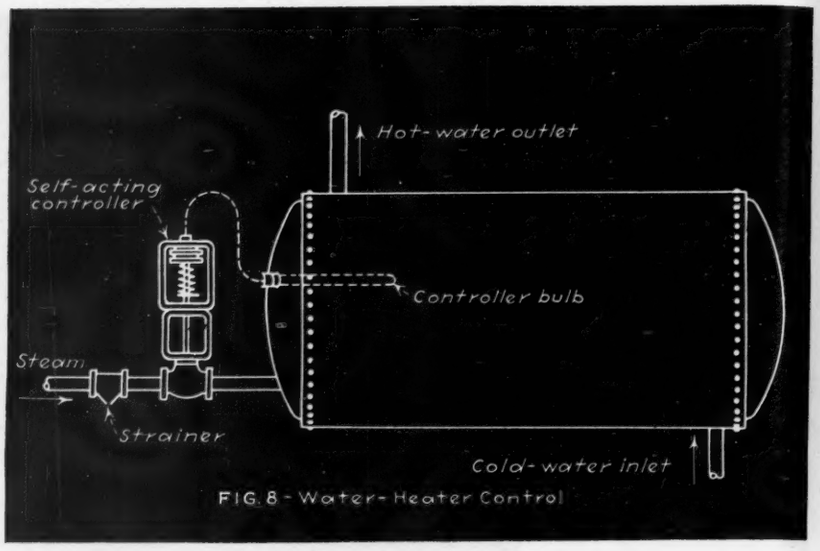


FIG. 8 - Water-Heater Control

In selecting valves it may be important to choose one which will close in event the control system fails. Also, it is quite important to install a throttling valve in a pipeline with a diameter much larger than the opening in the valve itself when the pipe is long. In a pipe too small, friction will be sufficient to restrict the flow to an extent that flexible throttling cannot be attained.

Air-actuated diaphragms, of course, will operate other devices than valves, such as dampers, or electric switches in motor-, solenoid-valve or electric heating circuits.

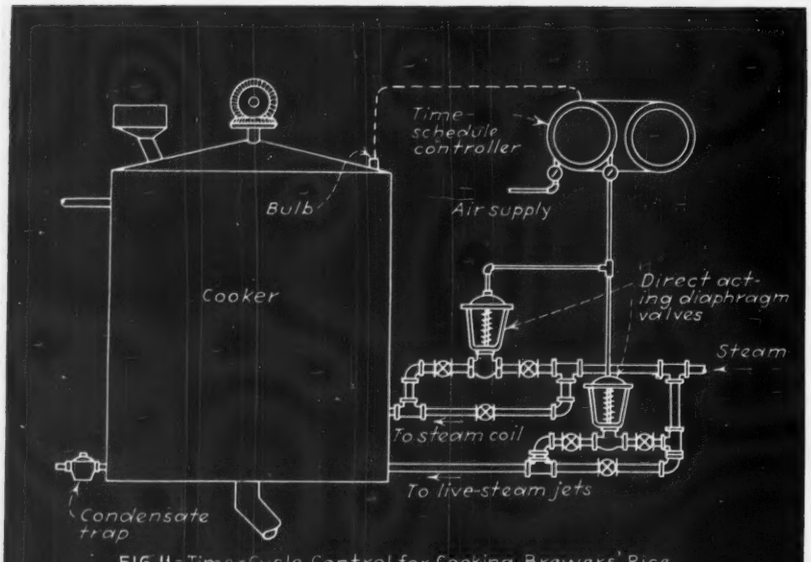


FIG. 11 - Time-Cycle Control for Cooking Brewers' Rice

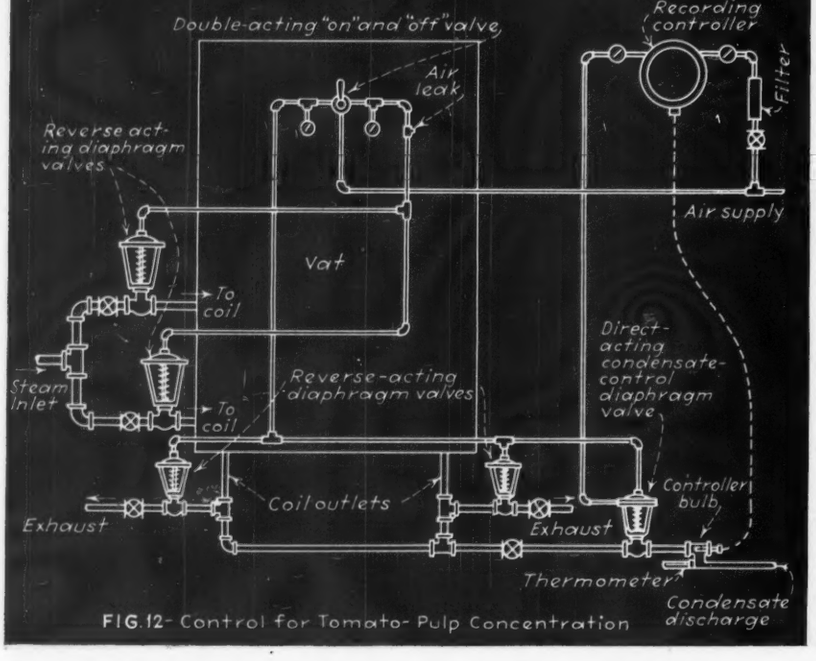


FIG. 12 - Control for Tomato-Pulp Concentration

FOR power-valve operation, electricity, too, will convert the action of a sensitive element into an opening or closing of a valve. Electrical controllers may be utilized with the same sensitive elements as the fluid-operated systems, and in addition with thermocouples and resistance thermometers. The valves controlling the flow of the heating medium, of course, will differ from those actuated by fluid pressure, being either of the solenoid or motor operated type.

A common electric controller utilizes movement of a pressure spring or a differential-solid-expansion unit to "make" and "break" open metal contacts carrying a small current. One variety of this has one set of contacts giving single-point control, while another type, often employed in controlling food process temperatures, has "high" and "low" contacts. Illustrated in Fig. 4, this type may

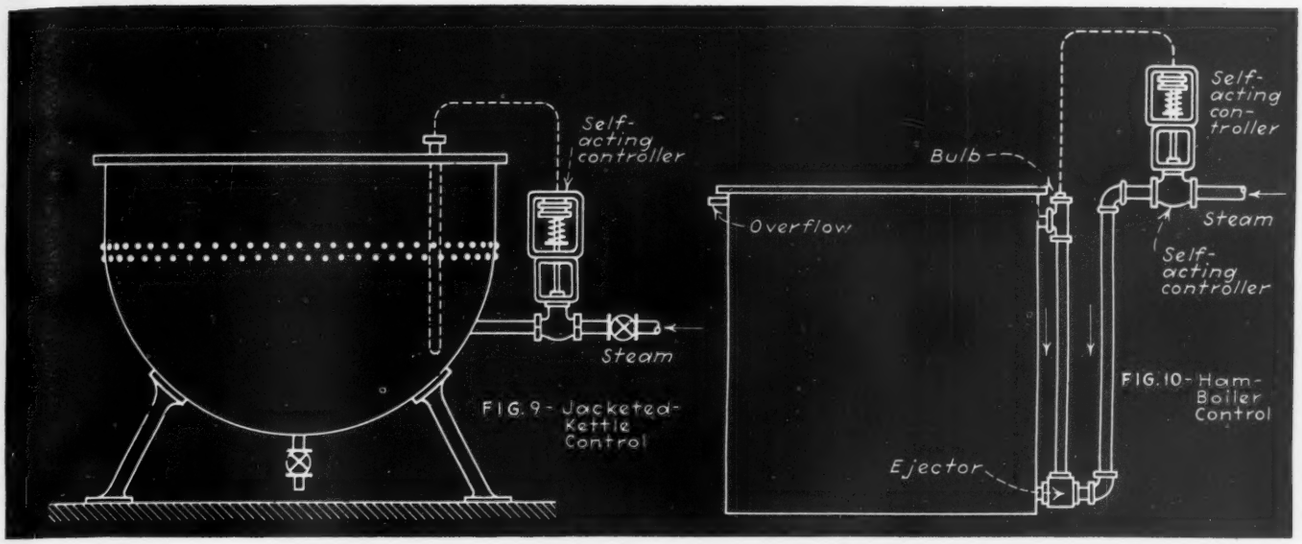


FIG. 9 - Jacketed-Kettle Control

FIG. 10 - Ham-Boiler Control

readily be set at any control point within its range, since the contact-point mountings are pivoted to swing through the arc of the pointer, or common-contact mounting.

One metal-contact controller uses contacts mounted flush on disk-segments of insulating material, the segments being rotated under brushes by the pen movement. The purpose of this design is to avoid arcing across the contacts and consequent chatter in the controlled relays or switches. Another type of metal-contact instrument is of the galvanometer type, a depressor bar pushing the galvanometer needle against "high" or "low" contacts.

In another electric controller, the expansion unit of the sensitive element operates, through a tilting mechanism, a mercury-in-glass switch to make and break contact. This switch has a higher current-carrying capacity than the metal contacts, the ordinary form handling from 2 to 10 amp., a special form, 10 to 50 amp. In many applications these currents will be sufficient to operate the valve without the aid of a relay.

A refinement of the mercury-switch controller, which frees the sensitive element of the work of operating the switch, embodies an indicating or recording controller with a motor-driven switching mechanism. This device "feels" the position of the pointer or pen several times a minute through the action of a chopper bar. If, for example, the process cools until the pointer falls below the control temperature, the chopper bar will strike the pointer and in doing so put into "gear" the switch tilting mechanism to make contact and initiate the flow of the heating medium. The opposite action occurs when the temperature rises beyond the control point.

When the contacts of electrical controllers do not carry enough current to operate the controlled valve directly, relays are connected into the circuit to "amplify" the power. Ordinarily, these utilize the current flowing through the instrument contacts to trip an electromagnetic switch which closes a circuit supplied with power from the line. A simple type of relay, used with single-contact controllers, is shown in Fig. 5. This relay supplies power to an electromagnetic switch which connects the load to the power line.

A more recent development in electrical control embodies an electronic relay, or amplifier, operating on the principle of radio amplification. Intended only for high-precision work, this relay requires only a few microamperes to control, without auxiliary equipment, 110-volt current of from 6 to 30 amp.

THE solenoid valves (Fig. 6) operated by electric controllers ordinarily are of the open-and-shut type. When current flows through the coil, the electromagnetic action draws the iron plunger farther into the coil and opens the valve against the pressure of a spring. Motor-driven valves are available both for open-and-shut and throttling action. A type illustrated in Fig. 7 utilizes a non-reversing motor which actuates an open-and-shut valve through a gear train and a cam. A limit switch stops the motor after the valve has been operated and automatically connects the motor circuit to the contacts which will be closed when the control switch tilts in the opposite direction. In another open-and-shut valve, the motor operates through a gear train to raise the valve stem, the motor then stalling and holding the valve open. As soon as the controller breaks the circuit and de-energizes the motor, a spring closes the valve.

Throttling motor valves may employ a reversing motor or a step-by-step or delayed-action device. Step-by-step control, used where there is an appreciable lag between the time the connection is made and the effect is transmitted to the controller, moves the valve a small amount, then briefly disconnects it from the motor gear-train, sometimes through the device of missing gear teeth. If the initial correction is insufficient, the valve moves through another increment when motor again connects with it.

EQUIPMENT for automatically controlling temperature in batch processes has a great many uses in the food industries. The processes to be regulated include heating of water, cooking, concentrating, enrobing, sterilizing, pasteurizing, steeping, mashing, smoking, sparging, fermenting, proofing, baking, deep frying, drying and bottle washing. To show what is being done in the way of automatic control, and to illustrate the proper methods of applying the control instruments to the processing equipment, specific applications will be considered. The controls shown, however, are not the only ones that can be used, but are exemplary.

Control of water heating is perhaps the most common application.

Fig. 8 shows a steam-heated water tank with an adjustable self-acting control in the steam-supply line. In this installation, it is significant that the sensitive element is located near the water outlet. Fig. 9 shows a similar control for a steam-jacketed kettle, this being an adjustable self-acting unit. In Fig. 10 is a self-acting type of control connected to a ham cooker, with the bulb in a pipe through which water from the cooker is circulated by an ejector.

In connection with the latter application, it may be said that many packers do not fully appreciate the desirability of automatically controlling temperatures at which they cook and smoke their products. Taking ham boiling as an example, the temperature with manual control will be too low part of the time and too high part of the time, resulting in either under cooking, a non-uniform product, or in loss of weight on account of fat being melted into the water.

The cooking of rice as done in the brewery, represents an interesting application of the time-cycle automatic temperature controller-recorder (Fig. 11). In this process the correct temperature must be maintained for certain predetermined lengths of time to obtain maximum starch extraction and give a uniform product day after day. This control system utilizes power-operated valves in the pipelines leading to the steam coils and the steam jets, both operated by the same controlling instrument. Time-cycle control is effected by a cam driven by a synchronous motor.

CONCENTRATING tomato pulp without burning some of it on the coils, impairing color and flavor, is difficult with manual control. An air control system of the type shown in Fig. 12 handles the process quite satisfactorily. Sixty of these are employed in one large food plant. The system actually consists of two parts, manually-controlled air valves in the steam supply and exhaust lines of the coils and an automatically controlled air valve in the condensate-discharge pipe which also is under manual control. When the manual control is turned to the "off" position to stop the boiling, the valves in the steam supply lines close and those in the exhaust pipes open to empty the coils and cool them before they burn the product. In the "on" position the reverse action takes place, quick vigorous boiling preventing burning in this instance. Since boiling can easily be stopped and started, frequent testing for consistency of the product is

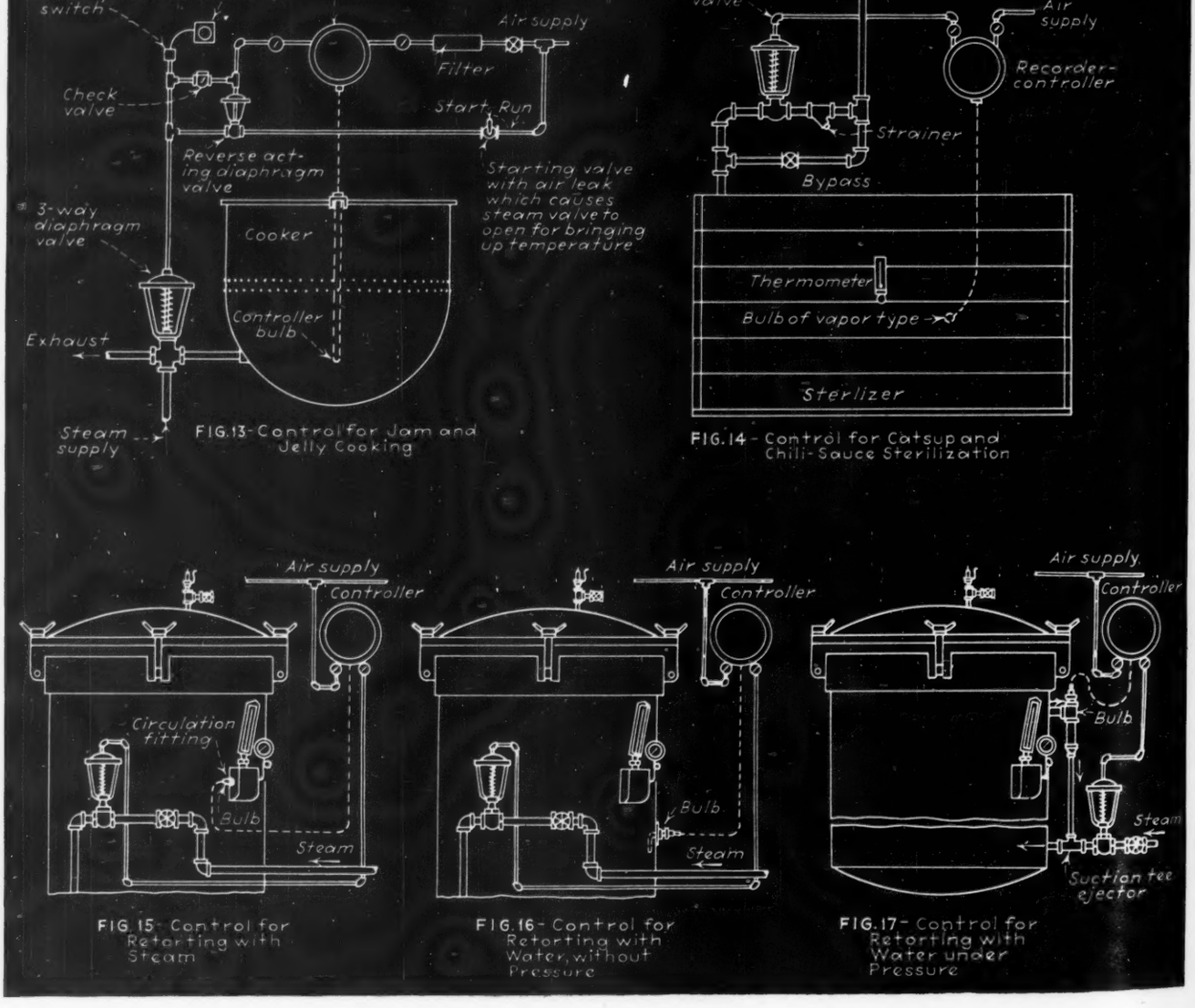


FIG. 13 - Control for Jam and Jelly Cooking

FIG. 14 - Control for Catsup and Chili-Sauce Sterilization

FIG. 15 - Control for Retorting with Steam

FIG. 16 - Control for Retorting with Water, without Pressure

FIG. 17 - Control for Retorting with Water under Pressure

permissible. The purpose of using the automatic controller to discharge the condensate is to make possible more rapid heating than could be obtained with a steam-trap discharge. This control has reduced the time of the boil from 25 to 50 per cent. Another attribute is that no cooling water is required.

Control of cooking kettle temperature is accomplished in Fig. 13 with a combination recorder-controller of the air-operated type, this being employed to cut off the steam at the correct "end point" for jams and jellies.

Fig. 14 shows how automatic control may be applied to a sterilizer for catsup and chili sauce. Here the temperature must be controlled within 2 or 2½ deg. F. to prevent fermentation as a result of undercooking or discoloration and poor flavor as a result of too high a temperature. Close temperature control also practically eliminates breakage of the bottles and improves steam consumption.

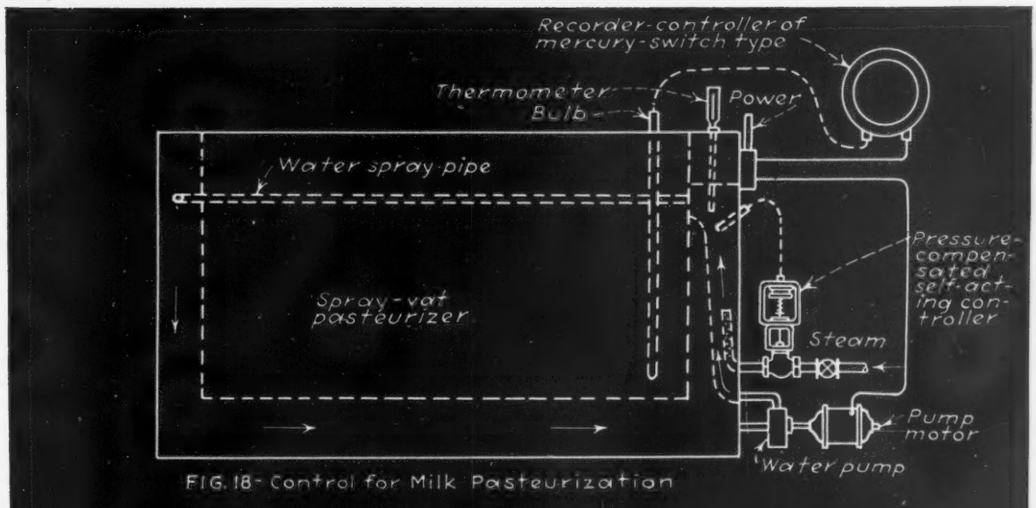


FIG. 18- Control for Milk Pasteurization

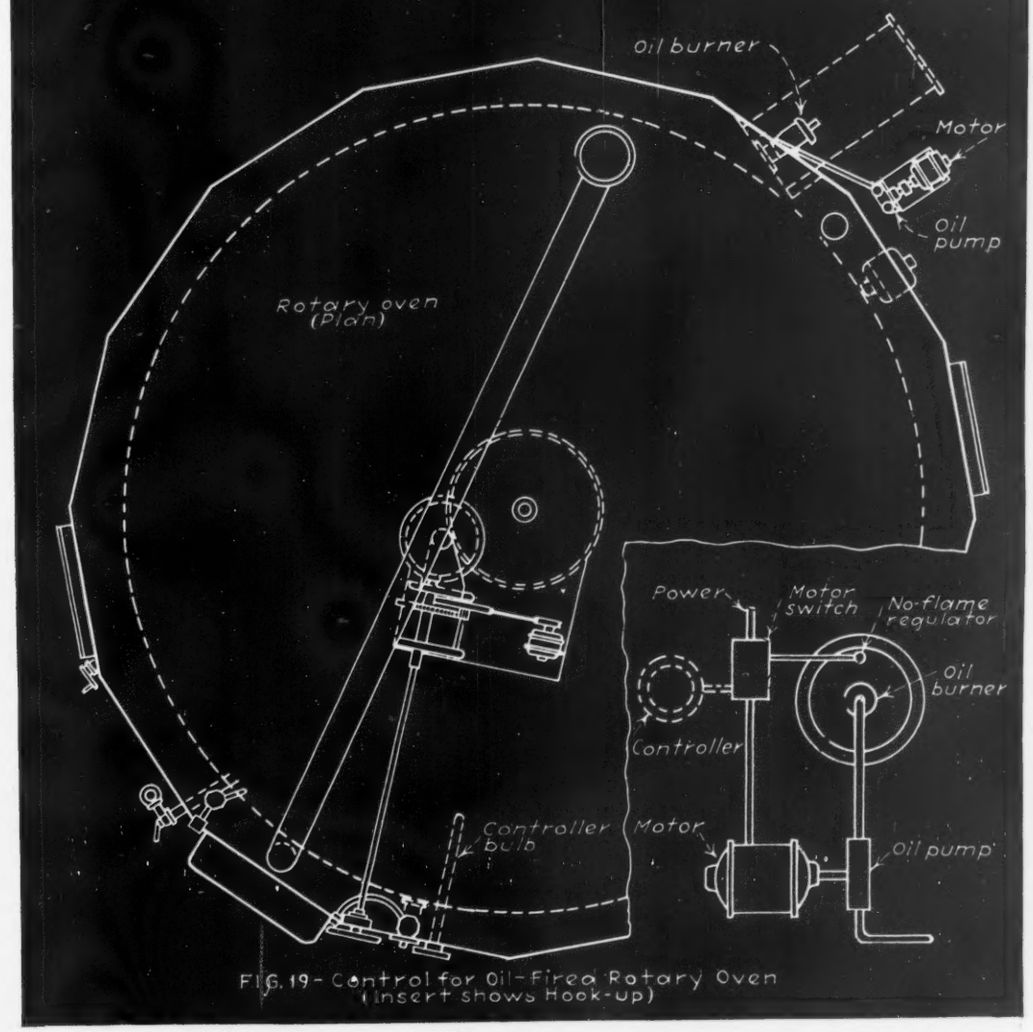


FIG. 19- Control for Oil-Fired Rotary Oven (Insert shows Hook-up)

ONE of the most difficult batch control operations in the food field is the regulation of retorting. While self-acting controls are employed for this by canners, more accurate regulation demands power-operated valves. The temperature controllers sometimes are installed in conjunction with pressure controllers and a time-cycle recorder-controller. Such a complete system will bring the temperature up, increase the pressure at the same time to prevent the caps from "blowing," process the batch for the proper length of time, cut off the steam, admit the cooling water at a rate which will not crack glass containers and at the same time decrease the pressure to prevent the caps from "dishing in." Such a control system is complex and involves considerable expense. For that reason it is not extensively used, but it exemplifies what can be done.

Fig. 15 shows a simple retorting control for processing with steam, utilizing a recording-controller, with an air-operated valve in the steam line. The bulb is located in a circulation fitting outside the retort. The control in Fig. 16 is for retorting with water where there is no pressure, and sometimes for processing in steam or water with pressure. This control differs from that in Fig. 15 only in that the bulb is inside the retort, being protected with a guard. For retorting

with water under pressure, the control in Fig. 17 may be used. Here the bulb is in a pipe outside the retort and circulation through the pipe is obtained with the aid of a suction tee or ejector.

Retorting often results in heavy spoilage under manual control, particularly when glass containers are being processed, and commercial installations of automatic controls have cut these losses from as high as 35 per cent to one-half of 1 per cent.

NO process in the food industries demands closer temperature control than the pasteurization of milk. Fig. 18 shows a modern control system for a batch pasteurizer of the spray-vat type, in which the milk is heated by hot water spraying down the outside of the vat. The water is heated with live steam and is circulated by a motor-driven pump. This system employs two controls, one being a pressure-compensated, self-acting controller to regulate the temperature of the water by controlling the flow of steam. The sensitive element of this unit is placed in the water header which supplies the spray pipes. The other regulator, a combination recorder-controller, has a sensitive element of the pressure-spring type, this actuating a tripping mechanism to operate a mercury switch. The switch opens and closes a circuit connected to the motor control box, acting to start or stop the motor when the temperature of the milk deviates from the desired point. The sensitive bulb of this control is immersed in the milk, and the unit holds its temperature within less than a degree from the correct point. An important feature of this combination control system is that if the steam valve should be open when the water pump stops, live steam would strike the sensitive element of the self-acting controller and close the steam valve immediately.

AN excellent example of the control of temperature through the regulation of the fuel supply is found in automatically controlled oil or gas-fired bake ovens. Fig. 19 shows a control system for an oil-fired rotary oven. One oil-burner heats this oven, a circulating fan distributing the heat to obtain even temperature. Regulation is effected by starting and stopping the motor driving the oil pump supplying the burner. This is accomplished through an electromagnetic switch operated by current from a contact type of electric controller. But to prevent unburned fuel from filling the oven, and exploding in event the oil should not ignite when the pump starts, a no-flame control is installed near the burner. To tie this in with the other controller, a holding type of switch is employed in the motor circuit. If the pump starts and there is no heat to actuate the no-flame control, the switch will "kick out" after a few seconds, stopping the pump. In this application the sensitive element of the main controller is located almost diagonally across the oven from the oil burner, and it is placed under the hearth instead of in the baking chamber.

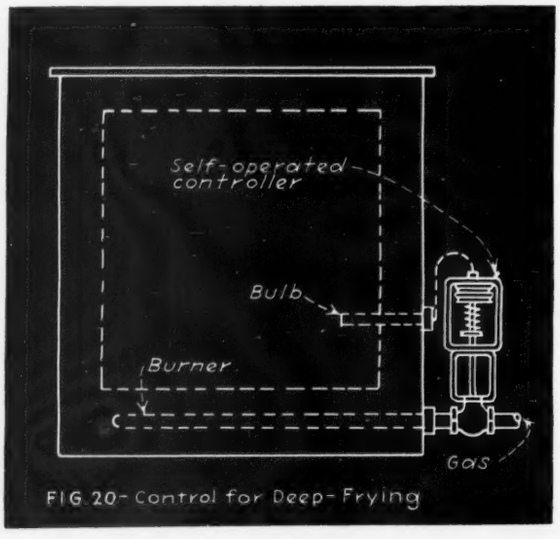


FIG. 20- Control for Deep-Frying

With ovens heated with steam tubes, a safety controller ordinarily is installed alongside the tubes to cut off the supply of heat if the regular controller fails. Suppose the oven control is set for 500 deg. F., then the safety controller may be adjusted to operate at 600 deg. so as to act before the pressure in the tubes becomes great enough to cause an explosion and wreck the oven. Such a safety is not needed in the rotary oven described above, because excessive temperature in this case would not damage the equipment, the only loss being the product itself.

Another use for control in baking is in preheating heavy fuel oil to insure proper combustion.

In Fig. 20 may be seen a simple type of control, a throttling self-acting unit, for gas-fired equipment, the application shown being a deep-fryer. It throttles the flow of gas to the burner to maintain the desired temperature. Automatic control of deep-frying pays dividends, because it not only prevents spoilage through burning, but gives a product with uniformly good flavor and crispness. Moreover, it conserves the fat or oil used in frying. The controller used in this case, of course, is applicable to other gas-fired processes, such as baking.

MANY food manufacturers make the mistake of neglecting control instruments which they have gone to expense and trouble to install, with the result that the instruments cease to function properly or that the operators disconnect them altogether from the processing equipment. Long experience has proven that automatic controls are practicable, when properly installed and maintained.

An example of how to get the most out of this equipment, is seen in the system introduced by California Packing Corp. a few years ago. To insure accurate control, this company checks the instrument continuously with indicating thermometers, and every two or three months with certified thermometers. Then a well-defined maintenance procedure is followed. At the close of the canning season, instruments are removed, inspected and put into the best possible condition. In event of instrument failure during the operating season, an expert takes care of it. No one in the plant is permitted to make any repairs or adjustments, except that pen arms may be adjusted to make them agree with the indicating thermometers. The company's instrument man carries with him certified thermometers, tools, a spare instrument or two and most of the commonly needed parts.

When anything more complicated and delicate than self-acting controllers is employed in a plant, there should be some individual capable of taking care of it. And where the plants are too small to afford an instrument expert, recourse may be had to those connected with instrument manufacturing concerns for check-up and repairs.

Standard Brands' 3,500 truck fleet provides national distribution

Trucks and Dated Coffee

"OUR dating plan and rapid delivery system guarantee the freshness of Chase & Sanborn coffee," says Graham McNamee each Sunday night on Major Bowes' amateur radio program. Furthermore it is stated that the rapid delivery system permits the coffee to be packed in an inexpensive paper bag instead of a metal can, with the difference in the price of the container passed along to the consumer.

While the first impression of the average individual would be that a paper bag would not be as good a protector of the flavor of coffee as a metal can, here again the rapid delivery system guarantees the freshness of the product by not permitting any coffee to stay on the grocer's shelf for more than ten days. The date of packing stamped on every package enables each purchaser to prove to himself or herself how unfailingly this pledge is lived up to.

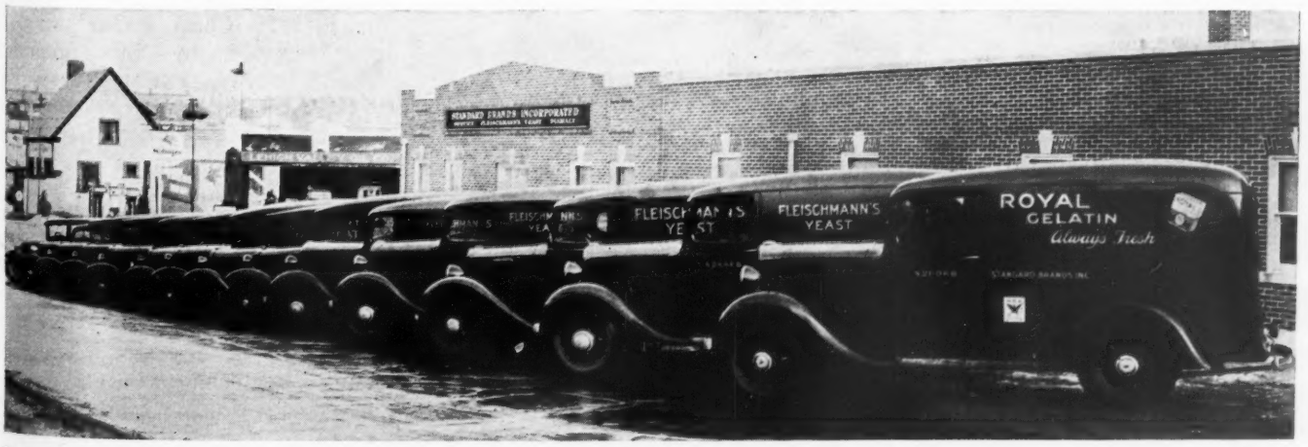
In order to get a proper perspective of the rapid delivery system which today distributes Chase & Sanborn's dated coffee, it is necessary to go back into the histories of the constituent companies of Standard Brands prior to 1929. Chase & Sanborn was founded in Boston, Mass., in 1864. In 1880 a Chicago branch was opened. The company obtained the coffee concession at the Chicago World's Fair in 1893 and set up a plant there where its coffee roasting and blending was done. The company's sales volume increased rapidly from 1893 on. By the fall of 1929, Chase & Sanborn coffee was a strong sectional brand with its principal distribution in New England and the Chicago territory.

The Royal Baking Powder Co. was founded in Fort Wayne, Ind., in 1866, and originated Royal baking powder, a leavening agent consisting of soda and cream of tarter. This product, at first considered a newfangled idea, received quick consumer acceptance. Now baked goods all over the world rise with Royal. The Royal company also manufactures Royal desserts, such as vanilla and chocolate puddings, Royal Gelatin in seven fruit flavors and Royal Aspic for molded salads and molded meat dishes.

Meantime, while the Chase & Sanborn and Royal companies were growing to business manhood, the Fleischmann Yeast Co., founded in 1868 in Cincinnati by Charles Fleischmann, who brought with him from Hungary a test tube of live yeast plants, was progressing. Its first yeast plant was built at Riverside, Ohio. Another plant was established on Long Island, and still later, the most famous of its yeast plants at Peekskill, N. Y.

By 1929, when the Fleischmann company entered the Standard Brands, Inc., merger, it was making most of the compressed yeast sold in the United States. This was sold and delivered fresh every few days to upward of 30,000 bakeries and to 250,000 other retail outlets including grocers, hotels and restaurants. Delivery was made direct from 1,000 Fleischmann agencies with these in turn supplied from fourteen central distribution points.

The Fleischmann transportation facilities built up to handle the distribution of its fresh yeast and other products consisted of over 200 railroad cars and 3,500 trucks, together with a personnel of 10,000 employees. Some of the railroad cars are fitted with tanks to carry vinegar, the



One of the local truck fleets, which combined with other similar fleets, provides national distribution for Chase & Sanborn dated coffee; Fleischmann's yeast and Royal Gelatin and Baking Powder and other products. The fleet pictured above is lined up in front of Standard Brands, Inc., office in Allentown, Pa., and serves the surrounding territory. Note that the trucks are all ½-ton panel delivery models, that in the immediate foreground being a Chevrolet; that next to it a Ford and an International next to the Ford. Note also the variety of the side panel lettering.

Fleischmann Company being one of the world's largest vinegar producers.

ALTHOUGH the motor trucks formed the backbone of the delivery service, the Fleischmann company, to carry on its time-honored tradition that "The baker must have his yeast at all costs," was forced in many emergencies to use any and all means of transportation to make its deliveries. In the floods in New England in 1927, the Fleischmann company chartered all airplanes in that area to take the yeast through. Some of the hired planes even carried the mail, and newspaper men and news services had to obtain planes through the Fleischmann traffic department. Floods, blizzards, earthquakes, storms, all have to be circumvented in some manner. In Canada, sleds, dog teams, snowshoes were often the means utilized in times of emergencies to make deliveries.

Regularity and dependability of delivery are the two most important features of the nationwide Standard Brands, Inc., delivery system. The view above shows a Standard Brands, Inc., Ford arriving in front of a grocery store in Long Beach, Calif., five hours after the front of the store fell into the street as a result of an earthquake. The salesman-driver is delivering on time the grocers' order of Chase & Sanborn's dated coffee.

Another of the kinds of transportation employed by Standard Brands, Inc., to insure deliveries on time. The seven cases of Royal Baking Powder are getting a royal ride, judging from the dress of the Zulu pulling his ricksha in one of the towns of Zululand, South Africa.

Nineteen airplanes were pressed into service by Standard Brands, Inc., to augment the company's nationwide delivery system during the first week of the recent 1936 flood emergency. Ten left from the Newark, N. J., airport to cover flooded Pennsylvania points where it was possible to land; five took off from Cleveland for Wheeling and Pittsburgh; two from Camden and two from Boston to New England points cut off by road and rail. They were loaded with Fleischmann's yeast and Chase & Sanborn's coffee. Bakers who were able to continue operations were supplied with yeast as usual.

Only four of the planes had to come back and report inability to land because of flooded fields, or ice and sleet on their wings. They took off again and made it on the second trip.

When Chase & Sanborn joined the Standard Brands, Inc., merger in 1929, the Fleischmann yeast delivery system with its from 250,000 to 300,000 outlets, was available for coffee distribution. However, the idea of a "dated" delivery service grew out of the results of a scientific study of coffee which indicated that coffee begins to lose flavor and aroma immediately after roasting and that coffee contains an oil which when fresh is sweet, but when stale becomes bitter.

With the close to 300,000 Fleischmann yeast outlets served twice a week by the Fleischmann delivery trucks, the latter solved the problem of getting the coffee from newly-established roasting plants to these outlets immediately after roasting. The "dating" of the package and the rule to take back any coffee on the grocers' shelves after a period of ten days, completed the merchandising picture.

NINE roasting plants are now used. In addition to those in Boston and Chicago, others are located in Seattle, Dallas, Birmingham, Los Angeles, Hoboken, Cleveland and Montreal. The Fleischmann delivery system was increased and the trucks began to deliver dated coffee. From a strong sectional brand sold in New England and the Chicago area in 1929, Chase & Sanborn coffee, delivered by the Standard Brands, Inc , truck fleet, now is distributed nationally throughout the United States and Canada and is one of the first three brands in point of sales volume in the entire industry.

The same trucks which deliver the Chase & Sanborn coffee also take back whatever coffee has been on the grocers' shelves for ten days, whenever there is any to take. This seldom occurs because stocks are very carefully regulated.

The truck delivery service contacts each grocer at least three times within any ten-day period. The driver-salesman is furnished with the sales record of every grocer on his route. By this means he is able to stock each

grocer with just enough coffee to cover anticipated sales until his next visit. Should his stock become exhausted, the grocer simply calls the nearest Standard Brands, Inc., office and the regular truck, located on the route, or a special delivery truck, delivers the additional fresh supply almost immediately. With such precautions, the amount of coffee returned is negligible.

What is picked up, is sold for immediate consumption at a reduced price to institutions and other outlets which otherwise could not afford a product of such merit. This is somewhat analogous to the policies of milk companies in selling certified milk, which cannot be sold after twenty-four hours, to employees at a reduced price; or bread companies which sell second-day baked goods so labeled from company retail stores in or near their plants.

The present Standard Brands, Inc., fleet used for the delivery of Chase & Sanborn coffee and tea; Fleischmann's yeast and the Royal Baking Powder products consists of approximately 3,500 trucks. These are of two types.

The heavy-duty type of which there are approximately 100 trucks, are operated by a subsidiary company, the Fleischmann Transportation Co., and are used chiefly for heavy hauling between factories and offices. The remainder are lighter units, ½-ton and 1½-ton trucks, which are used for store-to-store deliveries.

There are three types of routes. These consist of the bakers' routes, on which Fleischmann products for bakers are distributed; the grocers' routes on which all Standard Brands, Inc., goods are delivered and the mixed goods routes operated in suburban and small rural areas.

The Standard Brands, Inc., fleet serves a total of 16,000 cities and towns. An additional 36,000 cities and towns are served by common carriers so that the company's products reach practically every nook and corner of this country and Canada. The total outlets served number over 400,000. The truck fleet covered more than 40,000,000 miles in 1935.

Another ricksha delivery of Royal Baking Powder and Gelatin Desserts, this time in Hong Kong, China, with the salesman in the seat and the coolie providing the motive power.

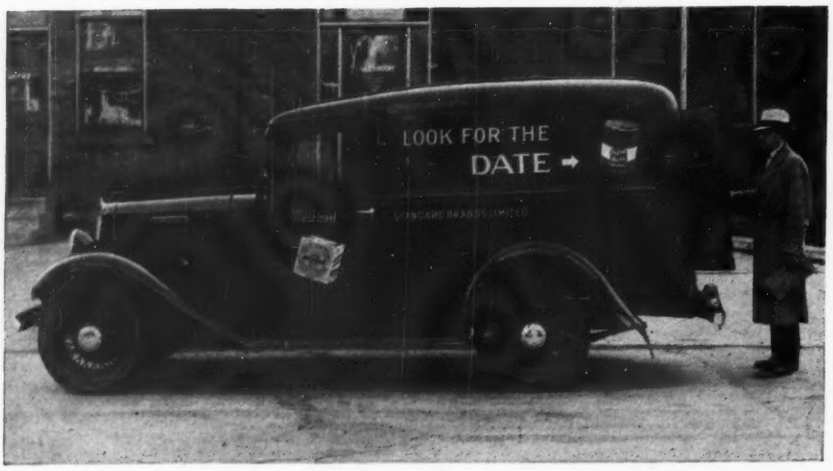
The operation and maintenance of this huge fleet is controlled through nineteen divisional offices in the United States and Canada. The manager of each divisional office maintains direct contact with the home office in New York City and is responsible for the operation and maintenance of that portion of the national fleet working in his territory.

In operation, each route truck is loaded each day with fresh stock. In some cases, depending upon the type of route, a route may be covered every day. In others, the route may be divided into sections, with each section covered on consecutive days. On grocers' routes, all retail outlets are contacted at least three times during every ten-day period.

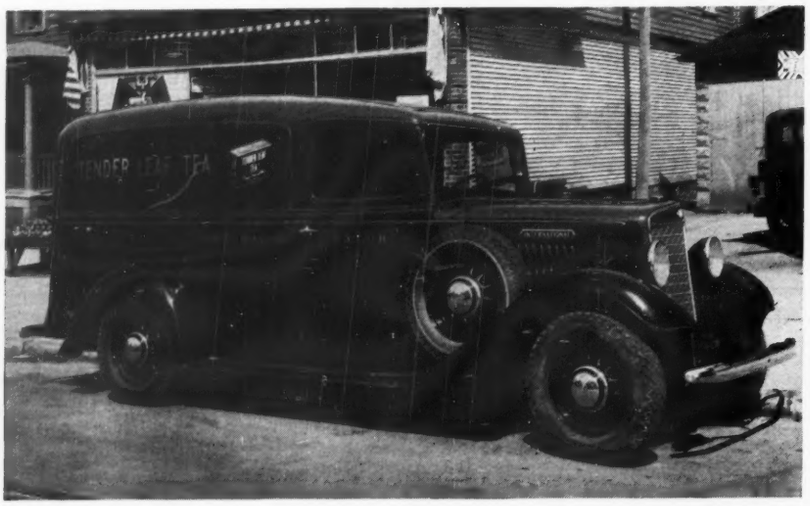
The truck operators are driver-salesmen and operate on the peddle system of both selling and delivering from the same vehicle. However, they attempt to undersell rather than oversell to insure the freshness of the company's products on the retailers' shelves. They carry the sales record of each customer on their routes and use this data to prevent overstocking.

The driver-salesmen carry no re-

One of the nineteen airplanes pressed into service by Standard Brands, Inc., to augment the company's nationwide delivery system during the first week of the recent flood emergency. It is shown being loaded from a company truck at the Newark, N. J., airport with Fleischmann's yeast and Chase & Sanborn coffee for Pennsylvania's flooded area. The only plane to land in Altoona, Pa., during a sleet storm at the height of the flood was a Standard Brands plane laden with yeast and coffee.



One of the International sedan delivery trucks operated in Canada by the Standard Brands Limited. The unit shown is in service from the company's office at Chatham, Ont. Deliveries are made from the rear door as shown.



One of the late model International ½-ton trucks with a 7-ft. panel body as used by Standard Brands, Inc., in the Albany, N. Y., area. As compared with the lettering on the other trucks shown in the accompanying illustrations, note that this truck features Chase & Sanborn's tender leaf tea.

A rear view of the International ½-ton truck shown above and used in the Albany, N. Y., area. Note the low and convenient height of the body floor; the full-width, two-part rear doors; the crosswise shelf directly in back of the driver's seat for separate small packages and the method of carrying yeast in a wooden box and packages of coffee, tea and Royal gelatin desserts.

sponsibility for the maintenance of their vehicles except the reporting of improper operation on the road and the filing of gasoline and oil consumption, tire changes, mileage run, and other operating records. They are tested as to their fitness to drive and are instructed to always drive carefully to avoid accident expense and to build up good will.

AMONG such good-will-building instructions are the avoidance of hogging the road; the giving up of their parking spaces to women drivers and the avoidance of splashing mud on pedestrians at crossings on rainy days.

The fleet is maintained by a series of 75 maintenance garages strategically located in the nineteen divisional areas throughout the United States and Canada. Those in each divisional area come under the respective divisional manager who is responsible for the preparation of cost budgets and requisitions for new trucks and shop equipment.

Each shop is equipped to handle major truck overhauls under the supervision of a maintenance foreman. The latter is responsible for the proper, economical operation of the garage; the maintenance of a running parts inventory; the regular inspection of the fleet and for the daily checking and reporting of gasoline and oil consumption; greasing; washing; tire mileage and tire replacement.

For example, the Philadelphia shop takes care of the 31 route trucks operated in the Philadelphia area and also those in service in eastern Pennsylvania, Delaware and northern Maryland, more than 100 trucks in all. In Canada, Standard Brands, Ltd., operates 198 trucks from Halifax, N. S., to Victoria, B. C. These cover annually some 2½ million miles.

Periodic inspection is the keynote of the Standard Brands, Inc., truck maintenance system. Vehicle condition must be reported daily by the driver-salesman. In addition to the inspections resulting from such reports, periodic inspections of certain vehicle parts are made after every 500 and 1,000 miles of operation. Each vehicle is taken out of service after each 12,000 miles of operation, or at the end of six months, whichever occurs first, for a thorough inspection and for such minor or major overhauls as the inspection indicates are necessary.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

Factors to Consider In Selecting Trailers

Question No. 16

1. What principal factors lead to the choice of trailers (either semi or four-wheeled types) in preference to trucks with two or three axles?

2. What do you consider the minimum load (in tons or cubic feet of volume) at which semi-trailers become preferable to conventional trucks?

3. What factors of operation, other than minimum load, limit the use of semi-trailers for retail food delivery?

4. What effects have road grade and road surfaces upon trailer selection?

5. When does a four-wheel trailer, pulled behind a conventional truck with body and load, become preferable to a tractor semi-trailer hauling the same total payload?

Trailers More Economical

I WILL endeavor to answer the five questions on the selection of trailers.

1. (a) The principal factor in the selection of trailers, either of semi-trailer type or four-wheel, is one of economics. It has been our experience that the trailer manufacturer is able to supply a ton of payload capacity in the tractor-semi-trailer unit for less money than the motor truck manufacturer is able to supply a truck of similar capacity.

(b) The State of New York is less liberal than some of the adjacent states in the maximum permissible axle load of a vehicle, and in order to get a payload of sufficient volume to keep unit costs at a minimum, it is advantageous to increase the number of axles under load. We have found that the semi-trailer type of vehicle with support wheels so it may be detached from the tractor unit is the type which not only affords us the lowest unit cost, but is also the one which lends itself best to our particular operations. We use these units for the bulk movement of milk as well as handling the box and can shipments from pasteurizing plants to delivery branches. In the latter service, the smaller space required for the detached semi-trailer unit at both plants and branches is a decided advantage due to our congested operations. Our city hauling from pasteurizing plants to branches is predicated on a scheduled return load of empty boxes and bottles or cans for each full load laid down, which makes the semi-trailer the most flexible and economical in operation. Each one of our tractors normally serves an average of four semi-trailer units, and it is therefore obvious that a much larger investment would be required were we to have a complete power unit for each of the semi-trailer bodies.

We do not use four-wheel trailers in our business primarily for the reason of congested space, mentioned above, that would militate against their being properly handled in and about our premises.

(c) The use of tractors instead of trucks allows a greater flexibility for maintenance purposes on running repairs, major overhauls, painting of either tractor or semi-unit, as well as replacement of the truck unit when necessary.

2. The minimum load in tons at which semi-trailers become preferable to conventional trucks is a question that is probably never settled to the satisfaction of all concerned. It would appear reasonable to assume that operators would not make an investment in a tractor and semi-trailer unit provided they could purchase a straight truck for as low a cost per unit of weight or bulk capacity, and at the same time, achieve the desired number of trips or miles per day out of that truck and its driver. The low cost of the 1½-ton trucks manufactured today cannot be overlooked, but unless these units are fully loaded and run the maximum number of miles, as well as being operated in service where there is no excess amount of time in loading and unloading, it is somewhat difficult to justify the investment required. There are many operators today that have gone to light semi-trailer units and tractors hauling small loads because of the factors of cost and operation mentioned above.

3. (a) The most important factor other than the minimum economical load limiting the use of semi-trailers in the retail delivery of food products appears to be their inability to park in a limited space left available on city streets today.

(b) The very nature of retail delivery of food products, involving a low mileage per day, necessitates a minimum investment per ton capacity and equipment consistent with durability and low operating cost.

4. Where the tractor semi-trailer unit is originally designed so that a sufficiently high percentage of the gross weight is carried upon the driving axle of the combination, we experience no difficulty in operating under all of the conditions encountered. The effects of gravity, rolling resistance and headwind resistance are practically the same upon the gross weight of the vehicle combination as for a straight motor truck.

5. A four-wheel trailer, pulled behind a combination motor truck, would possibly be preferable to a tractor-semi-trailer unit hauling the same payload where the conditions necessitate dropping that portion of the load in the trailer body and continuing the balance of the load in the truck body to a further point, providing it would be practical to pick up the empty trailer (or another empty trailer) and return same to a common starting point. Otherwise, a lesser gross weight would obtain for a tractor-semi-trailer unit because it has but a single body and because the construction of a four-wheel trailer is such that it weighs more than a semi-trailer for a given load capacity. We find that the general policy of the trailer manufacturers is to advocate the use of a tractor-semi-trailer in preference to a truck and four-wheel unit because of the greater maneuvering advantages of the former, as well as the economics of first cost and lower operating costs.—T. A. DRESCHER, *Manager of Transportation, Borden's Farm Products Co., Inc., New York, N. Y.*

Problems of Operating Semi-Trailers

Question No. 17

1. Are semi-trailers as safe to operate as conventional trucks?

2. On semi-trailer operation, what parts of the vehicle have required the most servicing?

3. What is the value of streamlining semi-trailer bodies, and how far should streamlining be carried?

Trailers Not As Safe

BELOW will be found our answers to the questions pertaining to the operation of semi-trailers. These are:

1. We would say that semi-trailers are not as safe to operate as conventional trucks for the reason that there are more parts to go out of order on the semi-trailer, and further, that they are large

and cumbersome and rather difficult to handle. Very often the braking system goes out of order and is not at all times dependable.

2. Aside from the repairs to the engine, the coupling and the braking require the most servicing.

3. We cannot give you a definite answer as to the value of streamlining semi-trailer bodies, except the advertising value.—CARL C. CLEMENTS, *Director of Safety, National Dairy Products Corp., New York, N. Y.*

Trailers As Safe, or Safer

SEMI-TRAILERS are equally as safe, or safer than conventional trucks, provided they are designed properly and are equipped with the necessary safety devices and brakes.

It has always been the theory in transportation that straight trucks could be handled better on ice and snow than tractor-trailers. Our experience has been the reverse, and we attribute this to the fact we operate all drop-frame semi-trailers, properly balanced, with the most modern type of brakes obtainable.

We do not have any chronic mechanical failures in semi-trailer operation, although spring hangers, axles, doors and door hinges possibly cause greater expense than any other items of maintenance.

We are believers in a moderate amount of streamlining, such as rounded fronts and roofs. We do not subscribe to any sharp pointed front ends or long tails on our trailers that would cause a loss of body space, increase the over-all length, or make it difficult to load and unload at warehouse docks.—F. O. TERRILL, *Chief, Warehousing and Transportation Department, Kroger Grocery & Baking Co., Cincinnati, Ohio.*

Little Service Needed

OUR VIEWS on the three points entering into the operation of semi-trailers are as follows:

1. Yes.

2. Very little service is required; brakes must be kept in good adjustment.

3. There is no value in streamlining, except as to appearance, if not carried to an extreme.—H. N. LAINE, *Manager, Globe Grain and Milling Co., Los Angeles, Calif.*

Streamlining Costs Space

AS OPERATORS of semi-trailers for Christian Feigenspan Brewing Co., we answer your questions as follows:

Semi-trailer operation is far more practical from a weight standpoint than that of a conventional four-wheel truck. A greater pay-load can be handled with approximately very little additional cost of operation.

PRACTICAL STREAMLINING

With the nose rounded and the roof dropped in front to the level of the car, this semi-trailer incorporates about all the advantage to be gained from streamlining for decreased wind resistance, yet it does not sacrifice capacity. The rear is square, because there is little vacuum drag at the speed at which such units operate. The cab-over-engine tractor permits a 27-ft. semi-trailer under the 35-ft. over-all-length law in Illinois.

Regarding the servicing we find a very slight difference in the cost over the conventional four-wheel truck, and there are no particular parts of the semi-trailer that require any added servicing.

We supply the brewery with aluminum trailers with rounded corners. It is a beautiful looking unit, but we have not gone into streamlining. We find, however, that the brewery has gotten quite a bit of advertising value out of those units. Our main object in their operation is keeping them clean and well painted. We have checked into streamlining and have found that you can lose quite some valuable space through this method.

The only time that semi-trailers are more or less unsafe to handle is, perhaps, in snowy weather.—CLARENCE J. ROEMER, *Secretary and Treasurer, Roemer Bros. Trucking Co., Inc., Newark, N. J.*

Brakes Need Attention

WE GIVE you the following opinions:

1. Semi-trailers are almost as safe to operate as regular trucks.

2. In semi-trailer operation the only part that needs any attention is the pneumatic brake.

3. Streamlining semi-trailer bodies has a large advertising value and in certain lines will pay for itself.—LOUIS R. LIPMAN, *Parkway Baking Co., Philadelphia, Pa.*

Fifth-wheel Requires Service

IT IS our opinion that the three questions on semi-trailer operation should be answered as follows:

1. Semi-trailers are as safe to operate as conventional trucks.

2. In semi-trailer operation the fifth wheel and coupling have received practically all the service rendered.

3. The value of stream-lining in semi-trailer operation is the lack of wind resistance on long runs on the highways. Streamlining should not be carried to the point where it interferes with the loading capacity of the trailer.—A. K. FISHER, *Vice-President, John F. Jelke Co., Chicago, Ill.*

Little Servicing Required

OUR experience indicates the following:

1. Semi-trailers are equally as safe to operate as conventional, four-wheel trucks of equal hauling capacity.

2. Semi-trailers require very little servicing mechanically, the bulk of which centers around the braking system.

3. Considerable saving can be shown in the operation of streamlined semi-trailers as compared to blunt-nose types. This is particularly evidenced where light duty tractors are in use and engines are operating at or near their peak continuously.

By streamlining, I do not refer to radical departure from the conventional practice, but have reference merely to the replacement of blunt-nose bodies with full rounded fronts drooping the roof at front to break more readily into the airstream and rounding back corners to reduce airstream friction and eddy pockets at the rear of the job.

As to how far streamlining should be carried, that depends entirely on whether you are considering this from a saving standpoint or from an appearance standpoint. From the operating standpoint, streamlining should not be carried to a point where it will interfere with loading or unloading or the proper placement of commodities in the body.—F. L. FAULKNER, *Automotive Department, Armour & Co., Chicago, Ill.*

Food Packages and Products

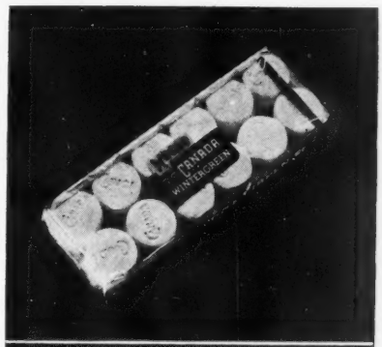
Package with Ripcord. Apparently taking a tip from the chewing-gum manufacturer, New England Confectionery Co., Cambridge, Mass., has come out with a transparent-cellulose package equipped with an easy-opening tape at one end. The cellulose enshrouding the twelve wintergreen pieces carries a printed design, this being accurately positioned by a photo-electric registering device on the wrapping machine.

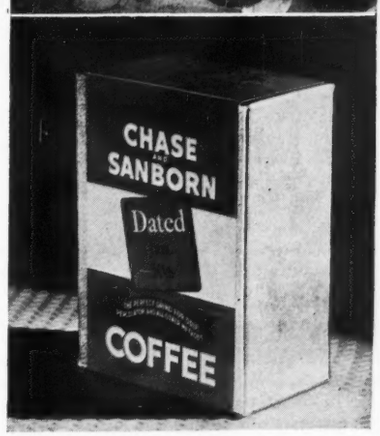
Dresses up Dressing. That an attractive, distinctive package can be created from a stock container has been demonstrated by Virginia Products, Inc., Montgomery, Ala. This company adopted for its French dressing a squat glass container with straight neck and pleasing body lines. To this it added distinction through an oval label and a wide neck-band with a black, gold and white color design that stands out in contrast to the tan color of the contents. A black, double-shell metal cap finishes the package.

Sausage in Bag. A package which effects economies for the packer and is convenient for the consumer is being used by Kingan & Co., Indianapolis, for pure pork sausage. This consists of a duplex paper bag, the liner of which is of grease- and moisture-proof parchment. Containing one pound, the package is of such a shape that patties may be sliced from it by cutting through the wrapper.

Chase & Sanborn Uses Foil. Formerly users of metal cans for coffee and more recently devotees of paper bags, Standard Brands, Inc., New York, now is experimenting with a foil-wrapped carton for its coffee. Though not proclaimed in advertisements, this package has been on sale in several Western cities for a number of months. It consists of embossed aluminum foil strip-mounted to a plain carton and covered with a center panel of paper bearing the Chase & Sanborn design.

"Orange" Oil. Reproduction of the true fruit flavor has been achieved in a new imitation orange oil recently perfected by Fritzsche Bros., Inc., New York, the company states. This product is held to be a cost saver for manufacturers using citrus flavors.





Bottled Orange Juice. "Better than juice from the average fresh fruit bought on the Northern market" is the claim made by General Fruit Products of Florida, Inc., Bradenton, Fla., for juice which it now distributes in bottles. After being removed from the tree and held for any length of time before consumption, the orange loses as much as 50 per cent of its vitamin-C content, whereas the bottled juice retains all the vitamin until used, according to the company. The prepared juice also is said to hold its flavor and food value. Three years of research were involved in developing the bottling process.

A wide-base, small-neck, stippled glass container of the type frequently used for condiments carries the juice to the consumer. This is closed with a crown cap and contains 12 oz.

Canned Bread. Another starch-restricted product, made in part of cottonseed flour, has been introduced by Nutty Brown Mills, Houston, Texas. It comprises steamed bread, put up in sealed tin cans. Instead of identifying the product with glued-on labels, the company wraps the can in a loose, all-over printed paper wrapper, this being in brown in conformance with the trade name.

Wine to Be Canned. Taking a tip from the success of canned beer, two wineries soon will introduce their beverages in this type of container. Bear Creek Cooperative Winery and Elk Grove (Calif.) Winery will be the marketers. The latter is constructing a $20,000 annex to house canning equipment, and 1,000,000 gal. of wine is available for canning if the new containers "take" with the public. This step follows exhaustive tests with several types of inside lacquers for the cans, these being made in cooperation with American Can Co. Twelve and 24-oz. cans will be used.

Trades Color for Wrapper. A moistureproof wrapper of transparent cellulose now protects the remodeled Jell-A-Teen package of Ensey Co., Los Angeles. This advantage was obtained without increasing the cost of the package by sacrificing one color on the carton, two being used now instead of three. Another feature of this package is that the names

of the product and of the flavor are easily read, whether the container be stacked on the shelf or thrown into a basket.

Bitters in Sausage. Something long done by hotel chefs and by a few housewives in the preparation of meats now is being tried out on a commercial scale by several meat packers. These packers are adding bitters, a product of Angostura-Wuppermann Corp., New York, to sausage products to intensify the flavor. Only a small amount is used, about one ounce to 100 lb. of meat.

Angostura - Wuppermann has licensed packers in Chicago, Detroit, Minneapolis, St. Paul, Kansas City, St. Louis, Denver, Cleveland, Indianapolis, Omaha and other cities to use the flavoring process. Special seals and tags are supplied to identify the new style sausages, and the company will employ publication advertising to back the packers.

The formula is said to have produced surprising increases in sales for the packers using it.

Beef Extract. By adding several kinds of seasonings to a beef extract, Armour & Co., Chicago, has produced "Vigoral," a preparation from which consomme and gravy may be made and which may be used to add color and flavor to mild tasting soups, gravies and stews. Following success in 1-lb. bottles for hotels, restaurants and institutions, the product has been put up in 4½-oz. containers which retail to the housewife at 45 cents, with a 1-oz. trial size selling at 10 cents. Triangular in shape, the container is distinctive.

Spigot With Every Keg. For the convenience of cheese makers to whom it sells its rennet extract, Marschall Dairy Laboratory, Madison, Wis., furnishes with each keg of the product an "easy-flow" spigot. The purchaser merely pries off a small metal cover and inserts the spigot, which is made of bakelite. The handle serves as the faucet through which the rennet drains.

Vitamin-D Beer. "Sunshine" brew recently was introduced by Joseph Schlitz Brewing Co., Milwaukee. In the manufacture of this beverage, the company recovers from brewers' yeast the provitamin D, ergosterol. This is put into solution and irradiated with ultraviolet rays from the sun, the infra red and other harmful rays being excluded. After conversion of the provitamin, each lot is tested by biological assay for its potency.

A 12-oz. bottle or can of the beer contains 100 units (U.S.P.X.) of vitamin, or almost twice as much as ordinarily present in irradiated milk. The beer has the same appearance, taste, bouquet and "head" as the standard brew and sells at the same price.

Miscellaneous Publications

OPERATION STUDY. Prepared and published by Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 1935. 8½x11 in., paper. Free.

INDEX TO THE LITERATURE OF FOOD INVESTIGATION, VOL. 2, No. 2. Department of Scientific and Industrial Research bulletin published by His Majesty's Stationery Office, London. 1935. 621 pp., 6x9⅝ in., paper. Price, $1.50. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

LABELING CANNED FOODS. Published by National Canners Association, 1739 H St., N.W., Washington, D. C., 1936. 18 pp. 6x9 in.; paper. Free.

Revised memorandum on descriptive labeling terms and on labeling laws and regulations for the canning industry and trade.

THE FEDERAL SOCIAL SECURITY ACT AND ITS ADMINISTRATION. By William B. Castenholz. Published by La Salle Extension University, Chicago, Ill., 1935. 18 pp., 6x8¾ in. Paper. Free.

THE TOWNSEND SCHEME. Published by National Industrial Conference Board, Inc., 247 Park Ave., New York, N. Y., 1936. 42 pp. 6x9 in., paper. Price $1.

As National Industrial Conference Board Study No. 219 this report discusses what the plan proposes, how it is expected to operate, and some of the economic effects of the scheme.

ALUMINUM IN FOOD. Report No. 78 on Public Health and Medical Subjects by G. W. Monier-Williams, Ministry of Health. Published by His Majesty's Stationery Office, London. 1935. 34 pp, 6x9⅝ in., paper, illustrated. Price, 30 cents. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

THE SOCIAL SECURITY PROGRAM. Prepared and published by National Canners Association, 1739 H St., N.W., Washington, D. C., 1936. 16 pp., 8½x 11 in. Paper. Free.

An analysis of the Federal Social Security Act and State Unemployment Compensation Laws already enacted (summarized in four tables) with suggestions and two proposed forms for the keeping of records necessary for compliance with the laws.

EVIDENCES OF RECOVERY AS REFLECTED BY BUSINESS ACTIVITY, CONSTRUCTION VOLUME, AND WHOLESALE PRICES. Prepared and published by Research Department of "America Fore" Insurance and Indemnity Group, 80 Maiden Lane, New York, N. Y., 1936. One-page graphic chart, 15x16 in. Free.

DEBASING THE CURRENCY. By E. S. Pillsbury, President, Century Electric Co. Published by Century Electric Co., St. Louis, Mo., 1936. 24 pp., 5⅝x8¾ in., paper. Illustrated. Free.

STATISTICAL ABSTRACT OF THE UNITED STATES. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C. 1935. 817 pp. 6¼x9¼ in. Cloth. Price $1.50; obtainable from Superintendent of Documents, Washington, D. C.

For 57 years the U. S. Department of Commerce has published this summary of authoritative statistics showing the trends in trade, industry, and social progress. It is a convenient reference book for business men as well as for economists, statisticians and students.

THE MAINTENANCE DEPARTMENT. Prepared and published by Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 48 pp., 8½x11 in., paper, illustrated. Free.

MANUAL OF SUGAR COMPANIES. 14TH EDITION. Published by Farr & Co., 90 Wall St., New York, N. Y., 1935. 128 pp., 5⅜x8 in. Price $1.

WEIGHT LIST FOR CANNED FOOD PRODUCTS. Published by National Canners Association, 1739 H St., N.W., Washington, D. C., 1936. 40 pp., 4x7½ in.; paper. Free.

List of suggested weights of can contents to be used on labels to comply with federal and state food laws.

The PLANT NOTEBOOK

Five dollars will be paid for brief stories which are suitable for use in this department. Sketches or photos should be provided whenever possible.

Pivoted Motor Bases

MOTOR DRIVES for machinery in the food industries have been equipped with pivoted motor bases with resulting great advantage. The following two examples from actual installations show what can be done with this type of mounting.

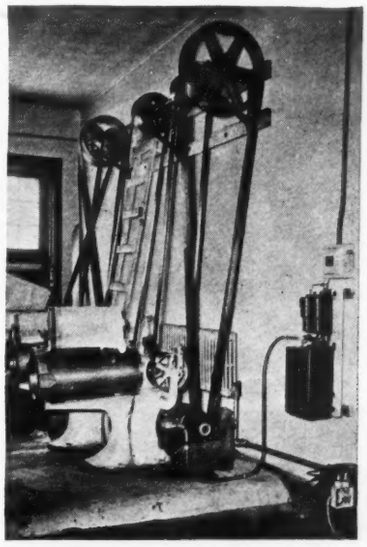
The Community Ice Cream Co., Malden, Mass., had a group drive consisting of two 40-qt. freezers, an ice crusher, and a pump. These machines were driven from a lineshaft hung from the ceiling. A motor, mounted on the floor, drove the lineshaft. This motor was a constant speed, 7½ hp., 1725 r.p.m. induction motor equipped with a 4½-in. diameter pulley, driving a 26-in. diameter pulley on the lineshaft through a 5-in. light double belt.

As the motor was located directly under the lineshaft because of space limitations, the drive was a difficult one. Any stretching of the belt caused it to slip, and with the climatic conditions prevalent in that part of Massachusetts, belts are subject to constant stretching under the best of circumstances. In addition, it was impracticable to avoid the vertical drive by supporting the motor on the wall near the ceiling on account of the noise which would be transmitted to the retail store on the other side of the wall.

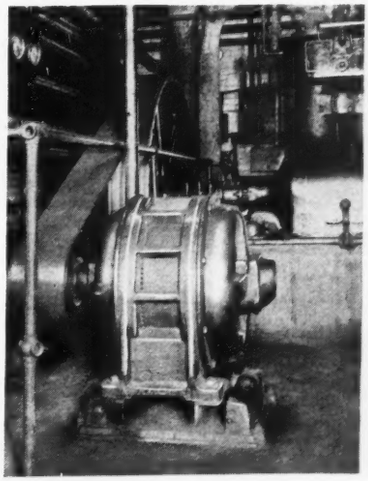
Consequently, the use of the pivoted base for the motor was a necessity unless constant attention was to be given to keeping the belt tight by shortening it at frequent intervals. The accompanying photograph shows how the motor was mounted.

At the Seven Oaks Dairy, Somerville, Mass., a refrigeration compressor was installed in a location where space was at a premium. In this case the necessary speed reduction called for a 12-in. motor pulley driving a 72-in. pulley on the compressor, using a 10-in. belt.

As first installed, the motor was placed as far away from the compressor as space permitted. Even so, it was not possible to keep the belt tight enough without the use of an idler. This idler had to be kept lubricated and was a source of some trouble, as it had to be replaced every two years and also caused excessive belt wear. Also, slipping was not eliminated even with the idler, and this caused additional belt wear, as well as power losses. Consequently, it was decided to install a pivoted base for the motor.



Group drives in an ice cream plant, with motor mounted on a pivoted base.



Pivoted base mounting for motor driving refrigeration compressor in a market milk plant.

With the new motor mounting, it was found possible to place the motor nearer to the compressor, thus saving space. The distance between pulley centers was cut down to 88 in., reducing the length of belt. Also the new pivoted mounting eliminated the slipping and power loss, and reduced belt wear. This installation is shown in the second photograph.—F. A. WESTBROOK, *Center Conway, N. H.*

"Minimum" Maximum Demand

PURCHASERS of electric power will do well to become demand-minded. Electric rates are based both on the energy charge, which is for the actual consumption of electricity; and on the demand charge, for the peak demand, or maximum flow of electricity.

The usual demand charge is about $25 per kw. per year, and is set by the maximum electric consumption for the highest 15 or 30 minute period in the year. For example, if the maximum electric flow during any 15 or 30 minute period of any month is 200 kw., then the demand charge for the next succeeding eleven months might be at the rate of $400 per month. The customer would then be billed for this amount plus whatever the charge might be for the actual electric consumption.

It is possible, through the intelligent use of power, to reduce the demand without reducing the consumption, and thus make savings in the electric bill. If the monthly electric consumption of a plant is 15,000 kw.-hr., while its maximum demand is 200

kw., it is operating at very low load factor, or ratio of average load to maximum load, in this case about 10 per cent. If the load factor were 40 per cent, the same amount of electric energy could be purchased with a maximum demand of 50 kw. Under these circumstances the reduction would be 150 kw. or $300 per month.

The maximum demand generally occurs during the same period each day, and the usual method of reducing the demand is to take out of service all equipment that can be spared during this period. There are also various devices as a help in this direction. One of these is the maximum demand meter, which records the maximum demand for each interval. Other instruments are available which give an alarm when the established maximum is being approached. Still others automatically cut off equipment so that the established maximum cannot be exceeded.—N. T. PEF, *Chicago, Ill.*

Low Cost Elevating

FOR moving supplies into the storeroom on the second floor of its plant, Smith Sanitary Dairies, Doylestown, Pa., has installed a device of low first cost that gives satisfactory service. Reference to the accompanying photograph shows the 1-ton traveling electric hoist that is used. This is mounted on a rail which projects from the building at roof level.

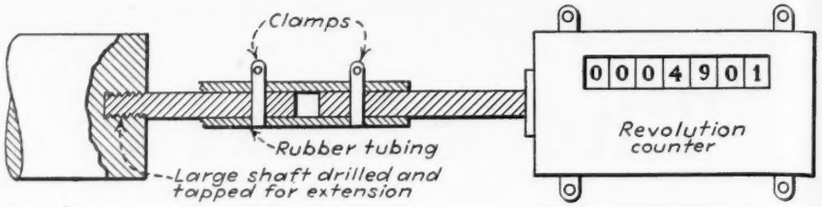
This hoist raises and lowers a platform that carries the supplies, picking it up from the ground after it has been loaded from a motor truck and setting it down upon a 2½-ft. landing balcony projecting below a double door that gives access to the second floor. The platform is then unhooked from the hoist, and, being mounted on casters, can be readily moved to any point in the storeroom.

The platform is made from channels and angles of steel. It has been used to lift loads up to 3,800 lb.

Advantages of this method of elevating supplies, in addition to low first cost, include the avoidance of the use of hand trucks, saving in time and labor, and the avoidance of the cost of an elevator license and inspection.

Couplings For Small Shafts

FOR such service as the direct connection of revolution-counters to rotating shafts, a simple and inexpensive coupling can be made by using a short piece of thick-walled rubber laboratory tubing.



Rubber tubing coupling.

Hoist for elevating supplies.

Portable ham washer.

The large shaft is tapped for a stud of the same diameter as the revolution-counter shaft. The end of this stud and the end of the revolution-counter shaft are then inserted into opposite ends of the tubing and held in place by means of clamps. This makes an extremely flexible connection.

The rubber tubing will compensate for any slight shaft misalignment. Should a jam occur in the driven mechanism, the tubing will shear or slip before serious damage is done. Periodical renewals of the tubing are necessary, as rubber is damaged by long exposure to the air. However, couplings such as this have been used in one plant for over eighteen months without requiring any maintenance.—S. H. COLEMAN, *Waynesboro, Va.*

Portable Ham Washer

TIME and labor involved in washing hams, after they are removed from the soaking vats, are reduced by a portable washer used by Arbogast & Bastian Co., Allentown, Pa. This washer consists of a galvanized iron tank, of welded construction, mounted on frame provided with casters.

About midway in the tank is a perforated plate which supports the hams and permits the water to drain off. A ¾-in. water line extends up from the ends and over the center of the tank, this having two "T" joints into which spray pipes may be screwed. Terminating in a spray nozzle, these pipes extend to within a few inches of the top of the tank. A hose connection on the water line, drain holes in the tank bottom, and foot-boards of angle iron to keep the operator off the wet floor, complete the design.

In practice, two men take meat from a soaking vat and place it on this portable washer, which is pulled up alongside. A third man removes hams from the washer and hangs them on trees to be taken to the smokehouse, first making sure that each ham is washed by the spray. This method avoids placing the hams in a truck and then unloading the truck at a washer.

The PLANT NOTEBOOK

NEW EQUIPMENT
for Food Manufacturers

Bottle Feeding Disk

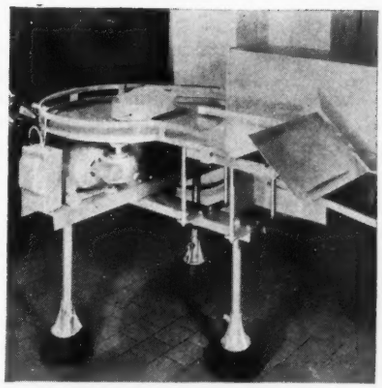
To PERMIT the feeding of bottles direct from the repacking cases as they come from the glass house into the filling machine with the minimum of handling, Horix Manufacturing Co., Corliss Station, Pittsburgh, Pa., has developed a new design of bottle feeding disks.

The operation of this device is as follows: The bottles come in cases that are used for repacking for final shipment, and are placed in these cases upside down. The bottom flaps are closed and sealed and the top flaps are closed but not sealed. These top flaps are opened and held down over the sides of the cases and the open top is placed against the filling table and the table tilted horizontally.

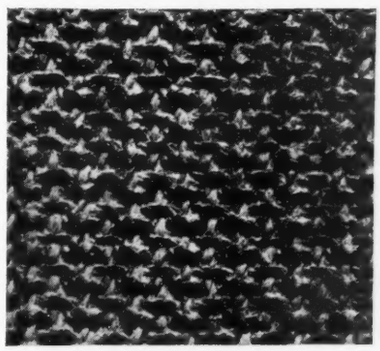
The case is then slid onto the permanent table top and lifted off, leaving the bottles standing upright. After the case has been lifted several inches, if the separators in the case do not lift with it, they can be grasped and lifted off at the same time as the case.

As the next case of bottles is placed on the tilting table, and moved forward to the permanent table, the forward edge of the case contacts the previous case of bottles and moves them onto the revolving disk. This disk carries the bottles into the feeding or "unscrambling" mechanism which separates the bottles, lines them up and feeds them onto the moving chain conveyor.

With this device it is said that one operator can dump the cases and feed the bottles so that a filling machine can be kept operating at a speed of 150 to 180 bottles per minute.



Bottle feeding disk.



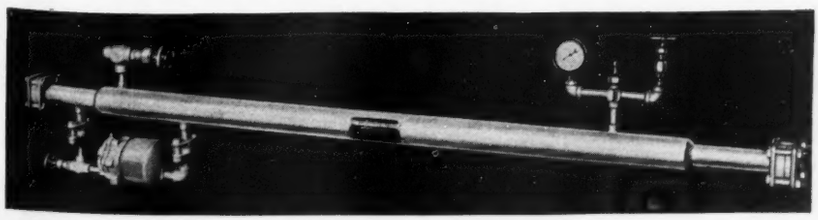
New surface for conveyor belting.

Package Conveyor Belt

KNOWN as "Griptop," a new type of package conveyor belting has been introduced by B. F. Goodrich Co., Akron, Ohio, which features a special rough surface on the rubber cover.

This special cover surface consists of a series of small rubber fingers, of which there are 3,000 to every sq.ft. of belt surface. These fingers are said to give unusual gripping power, and laboratory tests have indicated that the new surface has a tendency to increase in coefficient of friction with the increase of applied weight. Two test installations show this belting to be successfully handling paper cartons filled with cans on a 33 deg. incline and wooden beer cases on a 27 deg. incline. The new surface comes on belting up to 36 in. in width. It cannot be supplied on covers thinner than $\frac{3}{32}$ in.

Butterfat tester.



Gas purger for ammonia system.

Butterfat Tester

THE "Auto-Speed" Babcock Tester for determining butterfat content of milk, has recently been introduced by the Creamery Package Manufacturing Co., 1243 West Washington Blvd., Chicago, Ill. Simplified construction is said to permit easy operation and maintenance of this new tester. It is equipped with an especially-designed motor of correct speed characteristics such as found desirable by authorities for accurate butterfat determination. This motor is directly connected to the turntable or bottle carrier which is a balanced one-piece stamping to which the individual bottle cups are attached. These cups are of brass and are so attached that they tip freely when the tester is in operation. The base and the two-piece bowl are of cast iron equipped with a hinged door to provide for easy insertion or removal of test bottles. The top is removable for cleaning. Built-in switches are conveniently located in the base of the tester one operating the motor and the other an electric heating element. The device is made in 12-bottle size for 6-in. test bottles.

Gas Purger

A NEW refrigeration accessory for ammonia systems is offered by the Creamery Package Manufacturing Co., 1243 W. Washington Blvd., Chicago, Ill. The purpose of this device is automatically to purge an ammonia system of air or other non-condensible gases. The device eliminates hand purging.

This purger is available in seven sizes for use in systems with suction lines from 1 to 4 in. in diameter.

New Lighting Unit

AN INDUSTRIAL lighting unit with color characteristics said to approach actual daylight more closely than any other commercial lighting source, has just

been announced by the General Electric Vapor Lamp Co., Hoboken, N. J. Known as the circular mercury incandescent, the light consists of a unit in which a circular mercury vapor tube and an incandescent light are combined beneath one reflector to provide the desired spectral balance. The resulting light is said to approximate very closely that of the afternoon sun. The units, operating at 500 watts, are regularly equipped with a 33-in. mercury vapor tube and a 200 watt incandescent light.

The unit is installed and connected to the line in the same manner as an ordinary incandescent unit. Both lamp and vapor tube can be easily removed for cleaning or maintenance operation.

Oil-Resisting Air Hose

DESIGNED to overcome the deteriorating effect of hot oil from air compressors, a new air hose is announced by the Republic Rubber Co., Youngstown, Ohio. This hose is made from a compound similar to that used in hose built for conducting oil and it is claimed that it can actually be saturated with oil for long periods without detrimental effect to its serviceability.

The new hose also is said to have great resistance to heat, high pressure, abrasion and exposure to sun and weather. It has been developed for use where service is exceptionally severe.

Light-Proof Carton Material

TO PREVENT the passage of light through cartons and other paper containers, particularly the ultra-violet rays, Interstate Folding Box Co., Middletown, Ohio, has developed its "Protecto-Lite" board. This new material is made by incorporating a black film in the center between the layers of boxboard leaving the outer surface of the material of the normal or natural color. The film is introduced during the process of manufacture without any secondary operation. This is done in the following manner: the pulp on one of the cylinders which deposits pulp on the screen is colored black, usually with carbon black. The other cylinders carry films of uncolored pulp. The result is a finished material which is protected against the penetration of light rays at only slight additional cost. The protection provided by this material is said to be particularly useful in the packing of lard, fat-containing foods and other materials which become rancid or are otherwise affected by light.

Small Truck

To fill the gap between the half-ton commercial car and the 1½-ton truck, Federal Motor Truck Co., Detroit, Mich., has brought out a ¾ to 1 ton truck, designated Model 10. This truck has a 4-cylinder engine rated at 50 hp. and has been designed particularly to fill the needs of bakers and produce dealers, among others.

The gross capacity of the new truck is 7,500 lb. Three wheelbase lengths are provided as follows: 128 in.; 143 in.; and 152 in. 6.00x20 truck balloon tires and cast steel wheels are supplied. Dual rear tires may be furnished when necessary.

Two types of cabs are offered with this chassis: a standard cab with one piece sloping windshield and a de luxe cab with V-type sloping windshield. Both cabs have insulated roofs and are lined with plywood. The cab doors are 32 in. wide. Styling is of modern type.

Labeling Machine

WHITE LABELING MACHINE CO., 724 Second Ave., South, Minneapolis, Minn., has recently developed a new "Vac-Spray" labeler. This machine is operated by a 1 hp. single-phase motor, which may also be used to activate the conveyor, and is equipped with a DeVilbiss compressor and spray gun. It has been designed for flexible operation, particularly for use in plants where a wide range of containers must be labeled.

A rubber vacuum suction cup is used for picking up the label from the stack. As the label is transferred by the vacuum cup to the containers, it passes over the gum spray aperture. Automatically, the DeVilbiss spray gun covers all parts of the label's under-surface with a thin even coat of gum. The label is immediately pressed onto the container, and the method is claimed to use less gum than would otherwise be needed.

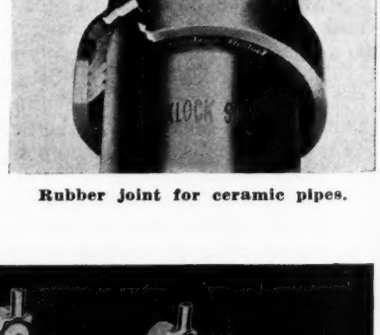
Containers are fed by hand to an adjustable track and move forward horizontally. As this forward movement is automatically controlled, the labels are applied on all containers at precisely the same relative position. After the label is applied it receives a preliminary pressing, and the container then moves forward. As it continues along the track to the accumulating table or conveyor, the container passes under a long sponge-rubber wiper. This completes the pressing of the label in position and leaves the container and the label clean.

Rubber Pipe Joint

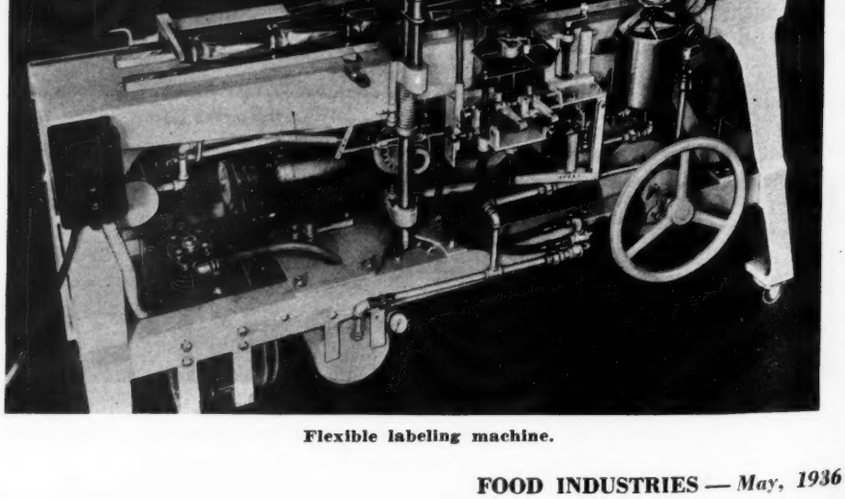
FOR USE with specially constructed ceramic pipe in low pressure service (maximum of 15 lb. per sq.in.) and at temperatures not exceeding 175 deg. F., the B. F. Goodrich Company, Akron, Ohio, recently introduced the Flexlock joint in conjunction with the U. S. Stoneware Co.

This joint is a rubber ring or gasket having internal and external circumferential ribs which grip the bell and spigot of the pipe. The design is said to permit easy insertion of the spigot. The shape of the corrugation combined with the resilience of the rubber is claimed to form a multiple seal which resists any tendency of the pipe sections to pull apart.

It is claimed that this joint offers a permanent positive seal for bell and spigot pipes conveying acids, alkalies and industrial wastes.



Rubber joint for ceramic pipes.



Flexible labeling machine.

The Manufacturers Offer

List numbers of the bulletins that you want. One coupon will bring them to you.

Food Plant Equipment

1. AGITATORS — Patterson Foundry and Machine Co. A new folder illustrates the many types of agitators, stirrers and mixers made by this company.

2. COFFEE CLEANER—Jabez Burns & Sons, Inc. A new folder describes the green coffee cleaner developed by this concern.

3. COMPRESSORS AND VACUUM PUMPS—Ingersoll-Rand Co. A folder discusses air-cooled compressors and vacuum pumps, sizes ¼ to 10 hp., and 30 in. vacuum to 1,000 lb. pressure.

4. CONDENSERS—The Trane Co. A new booklet gives information and data on evaporative condensers for cutting water and power costs on refrigerating and air conditioning installations.

5. CONVEYING SYSTEMS — Mathews Conveyor Co. A 56-page catalog, "Problems Solved," illustrates many installations of Mathews conveying systems.

6. CRUSHER-FEEDER—Nickel Engineering Works. Folder describes the design and use of two-roll type hammer mill feeders for grain.

7. DUST COLLECTORS—American Foundry Equipment Co. Folder No. 222, describes and illustrates the "Dustube" collector.

8. DUST ELIMINATION — Air Hygiene Foundation of America, Inc. Information Circular No. 1 gives the purposes, constitution and bylaws of this new foundation concerned with the hygienic phases of the elimination of industrial dusts.

9. MIXERS—Mixing Equipment Co., Inc. Folder illustrating permanent and portable types of "Lightnin" mixers and agitators.

10. MIXERS—Read Machinery Co. A 20-page bulletin describes the new line of streamlined vertical mixers for food manufacturing plants.

11. REFRIGERATION EQUIPMENT — Frigidaire Corporation. A new booklet contains information about commercial refrigeration compiled from field studies and laboratory research.

12. SCREENS—Audubon Wire Cloth Corp. Catalog No. 40, is a 56-page bulletin dealing with mesh wire cloth, space wire cloth, and flexible wire cloth for screens and other purposes, gives specifications and data for the full range of products.

13. SPRAY NOZZLES — Chain Belt Co. Folder describing design and use of "Rex" flat spray, non-clogging, nozzles for industrial washing and cleaning.

Plant Supplies and Accessories

14. BELT LACING—Flexible Steel Lacing Co. Folder E, announces special lengths of "Alligator" steel belt lacing, from 14 to 96 in.

15. BOILERS—Combustion Engineering Co. Catalog No. H-5, describes and illustrates the use of CE-Heine box header boilers for steam power plants.

16. ELECTRIC MOTORS — Wagner Electric Corp. Bulletin No. S-D-549, gives service instructions for capacitor-start, induction-run motors.

17. FACTORY BUILDINGS—The Austin Co. "Multistory or Single Story—Which?" an 8-page bulletin, compares the cost and operating advantages of the two types of factory structure.

18. FACTORY TRUCKS—Lewis-Shepard Co. Circular No. 317 deals with rubber-tired, easy-rolling factory and warehouse floor and lift trucks.

19. SILENT CHAIN DRIVES — Link-Belt Co. Catalog No. 1725 is a 32-page illustrated catalog of stock sizes of "Silverstreak" silent chain drives from ½ to 60 hp. giving specifications and prices.

20. VARIABLE SPEED DRIVES—Allis-Chalmers Mfg. Co. Bulletin 1261 describes the "Vari-Pitch Texrope Sheave," a multi-V-belt driving sheave of adjustable diameter, permitting driving speeds to be varied.

Packaging

21. CLOSURES—Armstrong Cork Products Co. All types of this company's closures for glass containers are illustrated in the 1936 Show Issue of "Modern Closures."

22. LACQUER COATINGS — Hercules Powder Co., Inc. A booklet discusses various uses of nitrocellulose lacquers as protecting and beautifying coatings for packaging materials.

23. PAPER TESTING — Thwing-Albert Instrument Co. Volume 1, No. 1, of "Thwing's Paper Tester," discusses the technic of checking on basis weight of paper.

Control Equipment

24. CONTROL EQUIPMENT — Automatic Products Co. Loose-leaf catalog of automatic controlling devices for heating, ventilating, humidity, air conditioning and refrigeration in industrial plants.

25. LEVEL GAGE—Petrometer Corp. Bulletin describes distant-reading tank-gages for indicating the level on tanks containing such products as oils, syrups, molasses and water.

26. OPTICAL INSTRUMENT — Bausch & Lomb Optical Co. For rapid measurement of linear intervals between spectrum lines on the photographic plate, the spectrum measuring microscope is described in a new folder.

27. THERMOMETERS — H-B Instrument Co., Inc. Blue Book, Part III, illustrates and specifies indicating and recording thermometers for food plant and other industrial applications.

Chemical and Sanitation Supplies

28. CLEANSER FOR EQUIPMENT — Philadelphia Quartz Co. "Takes Less Elbow Grease," a folder discussing the use of Metso 22 for cleaning food plant and other equipment.

29. SODIUM BENZOATE—Seydel Chemical Corp. A leaflet discusses benzoate of soda as a food preservative and suggests the advantages of its active promotion.

Materials of Construction

30. PLASTIC MATERIAL—Thiokol Corp. A folder announces "Thiokol" molding powder, for making oilproof synthetic rubber molded articles and parts.

31. STAINLESS STEEL—Ludlum Steel Co. "New Ways to Increase Sales and Profits with Silcrome Stainless Steel," a 28-page bulletin, illustrates industrial, commercial and domestic uses of stainless steels.

Distribution

32. CANNED FOODS DISTRIBUTION — National Canners Association. "Consumer Education" is the title of a booklet discussing the work of the home economics division of this association.

33. DEALER HELPS — Forbes Lithograph Mfg. Co. "Getting Your Merchandise Off the Shelf," a 24-page booklet, discusses counter displays and similar dealer helps for producers of packaged products.

G. L. Montgomery, May, 1936
Managing Editor, Food Industries,
330 W. 42nd St., New York, N. Y.

TO THE READER: Use this convenient form to get the bulletins you need.

Please send me the bulletins indicated by the following numbers: _____

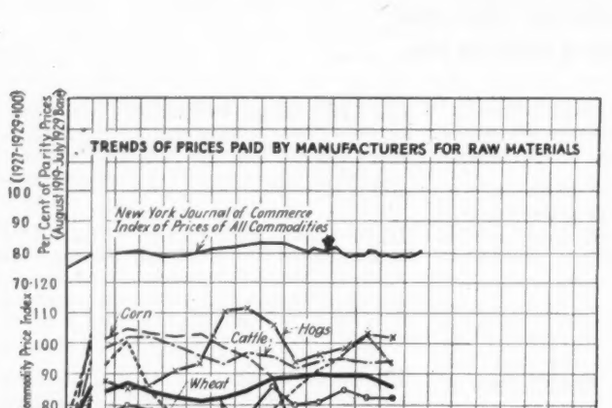
_____

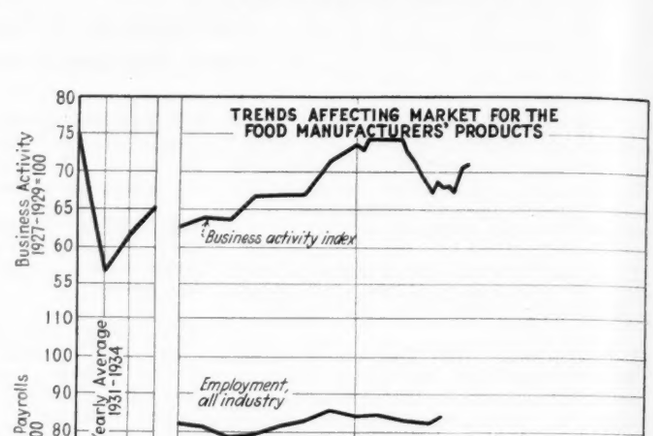
_____

Please Print **Employer** _____ **Your Name** _____

Position _____ **Your Address** _____

BUSINESS TRENDS


TRENDS OF PRICES PAID BY MANUFACTURERS FOR RAW MATERIALS
New York Journal of Commerce Index of Prices of All Commodities
Corn
Cattle
Hogs
Wheat
Butterfat
Ratio of all prices received to prices paid
New York Journal of Commerce Commodity Price Index (1927-1929=100)
Per Cent of Parity Prices (August 1909-July 1929 Base)
1935
1936



Wheat Prospects Change

WINTER WHEAT prospects, as of April 1, reported on April 10 by the U. S. Department of Agriculture, were almost 50,000,000 bu. lower than private estimates, and indicate that the March forecast of a total wheat harvest of 800,000,000 bu. may need to be revised downward by as much as 100,000,000 bu.

While some commentators regard this government estimate as too low, recent reports of an almost entire lack of rain during the first three weeks of April in western Kansas and neighboring winter wheat areas would make the figures seem too high, if anything.

Despite the increased wheat acreage this year, it is apparent that the weather is once more to be the controlling factor in determining the wheat surplus.

Canning Activities Extended

PLANS for increased production of canned foods are being made in some of the newer producing districts, indicating a continuation of the trend toward decentralization in the canning industry.

Evidence of this is given by a report of W. E. Dickerson, recently published in the San Antonio *Express*. Discussing a survey which he lately completed, Mr. Dickerson stated that eighteen plants in the Rio Grande valley will turn out 1,500,000 cases of canned foods this year, principally citrus fruit and tomatoes.

Another indication of this trend comes from the state of Washington, where present plans indicate a Northwestern pea pack for 1936 of more than 3,000,000 cases. This total has been reached almost entirely in the last three years, as prior to 1933 pea canning in Washington and Oregon was of minor importance.

Total 1936 pack of vegetables in the Northwest is forecast at over 4,000,000 cases, with increases in snap beans and corn as well as in peas. Asparagus is also expected to show gains.

In general, larger plantings of important canning crops are forecast throughout the United States. Sweet corn plantings are expected to be 3 per cent higher this year than in 1935, and a similar increase in snap bean acreage is expected. Plantings of commercial crop cabbage are now indicated at 168,000 acres, up 20 per cent over 1935.

Weather Hits Crops

FROST, rain and generally unfavorable weather in many parts of the United States indicate that revision may be necessary in some of the earlier forecasts of 1936 crops. Late March and early April saw four very heavy frosts in the California fruit growing districts, particularly damaging to the peach crop. Apricots, early cherries, plums, prunes and grapes were also hit. Damage to the almond crop was reported. Frost damage to vegetables in California was also considerable, with peas suffering pod discoloration; and asparagus, cantaloup, watermelons and tomatoes retarded if not hurt. Spinach in the northern part of the state has suffered further from dry weather, following the recent flood.

In Texas, in the truck and fruit growing regions of the north and east, heavy frosts around the first of April did much damage to tomatoes, peaches, plums, corns, potatoes and other crops.

Rain and frost in Florida did considerable damage, particularly to the bean and tomato crop.

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1936 (thousands)
Bakery	$37	$37	$819
Beverages	301	544	2,018
Canning and Preserving	264	.....	.....
Confectionery	.....	30	30
Grain Mill Products	475	824	1,822
Ice Manufactured	60	.....	224
Meats and Meat Products	.....	74	315
Milk Products	314	72	640
Miscellaneous	2,572	60	656
	$4,023	$1,641	$6,524

More Dairy Products

WHILE the number of milk cows on farms was estimated by the U.S. Department of Agriculture to be 2 per cent lower on April 1 this year than on the same date a year ago, production of milk per cow is up 6.8 per cent for the same period and is the highest since 1932. Total milk production is consequently greater than in 1935.

Butter production, up about 6 per cent, and cheese production, running 25 per cent higher, a greater receipt of fluid milk at principal consuming centers, and a slight falling off in case goods production, indicate where this increased milk flow is going.

Price trends for butter and cheese have not followed the production trend with exactness. In spite of higher out-

put, cheese prices have held steady. Butter prices regained during the first three weeks of April all the ground lost in March. Thereafter the price fell off again to near the March low point. This fluctuation is not in line with either the raw material supply or the seasonal trend, but is in part explained by the fact that cream production has lagged behind milk output. As the relation between feed prices and butterfat prices remains favorable to dairy production, an increase in the cream supply is in prospect.

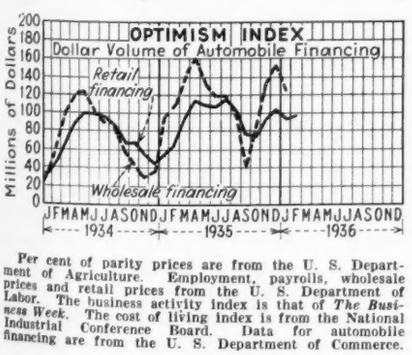
Corn-Hog Ratio

WHILE the corn-hog ratio fell off about 0.5 bu. during the past two months, at around 16.0 bu. it still is higher than for the past two years and compares to a 1909-1914 five-year average of 11.3 bu. This relationship is very favorable to hog production and, in conjunction with the existing good market prices for hogs, may be expected actively to stimulate hog raising. With the number of hogs on farms at 10 per cent over a year ago, every condition is favorable for a rapid increase in pig production.

Hogs available for slaughter during the remainder of 1936 are expected to be in sufficient quantity to cause the price to run well below 1935 levels for the remainder of the year. Certain factors in the packing industry are planning to reduce inventories drastically during the summer, so that they will have decks cleared before the heavy fall run commences. With the prospects for an increase in hog numbers already mentioned, it seems likely that the era of high pork prices is over, at least for several years.

High Prices Meet Resistance

IMMEDIATE response of retail food markets to price fluctuations was again indicated in April by the market for beef. Reflecting consumer demand, cattle buyers have shown a marked preference for cheap grade steers. Choice, long-fed cattle have been scarce, with the price high. But even this small supply has not been actively sought, in spite of some softening in the price. In contrast, demand for medium and cheap cattle is more active. The Chicago *Journal of Commerce* explains this condition by pointing out that general buying power of the public is still very low and, while demand for beef is increasing, it is for the lower-priced grades only. Retailers are reported to be selling more hamburger than ever before.


OPTIMISM INDEX
Dollar Volume of Automobile Financing
Millions of Dollars
Retail financing
Wholesale financing
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935
1936

Per cent of parity prices are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data for automobile financing are from the U. S. Department of Commerce.

Business Turns Upward

SHARP recovery from the shivers of February and the drenchings of March characterizes the movements of general business indexes at the beginning of the 1936 second quarter.

At 71.6 per cent of "normal," 14.0 per cent better than a year ago, the *Business Week* index of business activity for the week ending April 18 has advanced 4.83 per cent during the past month.

Steel manufacturing, automobile production, electric appliance sales and building operations are all at higher levels for the year, as are the net profits of 124 companies which have reported first quarter earnings.

Contrary to expectations, commodity prices have not yet advanced to any marked degree. Continued drought conditions in the Middle-West great-plains area, cold weather and storm conditions in the South, and flood destruction of food stocks have had a noticeable effect upon the prices of foodstuffs.

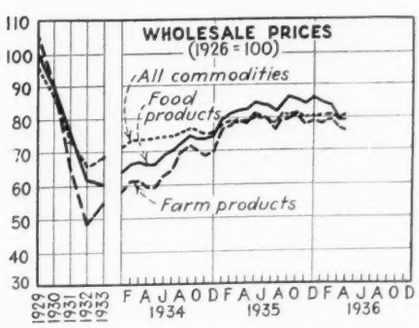
As reported by the U. S. Department of Labor for the month ending April 18, the prices of all commodities are 0.50 per cent higher. Those for farm products and foods are respectively 0.91 and 1.50 per cent higher. During the five-weeks period ending April 25 the New York *Journal of Commerce* general index of weighted prices rose 1.26 per cent. Grain moved 3.70 per cent higher and food jumped 4.53 per cent.

Indicators

SOYBEAN production in the United States for 1935 was approximately 40,000,000 bu., double the quantity produced in 1934.

RETAIL SALES of foods in dollars were 11 per cent higher in 1935 than in 1934, compared to an increase in all retail sales of 14 per cent.

FLOUR PRODUCTION was again up in March, according to General Mills, Inc., which reported for approximately 90 per cent of the industry an output of 5,356,455 bbl., compared to 5,210,535 bbl. for March, 1935; and 48,643,430 bbl. since June 30, 1935, compared to 48,071,119 bbl. for the year before.



FROZEN and preserved fruits in storage on April 1, 1936, totaled 63,616,000 lb., compared to 47,748,000 lb. on the same date in 1935, and a five-year average of 58,379,000.

DRIED FRUIT EXPORTS from the United States in 1935 reached a total of 403,952,455 lb., compared to 396,790,054 lb. in the preceding year.

FRESH VEGETABLE prices are likely to be relatively high until the new crops from Northern growing areas are available, because of the unusually severe weather conditions experienced in Southern regions during the spring season.

APPLE EXPORTS to Europe, six months ending Feb. 1, 1936, totaled 7,665,530 bu., compared to 4,345,207 bu. for the corresponding period of the previous year.

WHEAT CARRY-OVER STOCKS on July 1, 1936, are expected to be 135,000,000 bu., which is approximately normal for the first time in many years.

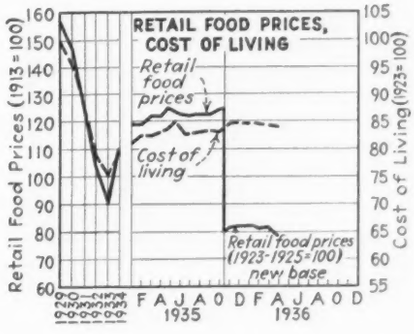
MEAT IN STORAGE, April 1, 1936, stood at 598,828,000 lb., which was 209,000,000 lb. less than the quantity in storage one year earlier.

FOOD PRICES rose 2.7 per cent during the first two weeks of April, according to the weekly food index of Dun & Bradstreet, Inc.

CARLOADINGS in mid-April were 6.1 per cent above loadings for the same period of 1935, and the adjusted index stood at 69.5, with 1923-1931 = 100 as a base.

FOOD PRICES paid by hotels in March were 2.25 per cent below prices paid in February, but were 2.49 per cent above the level of March, 1935, according to the index of R. M. Grinstead & Co.

BUSINESS ACTIVITY was at a six-year peak in mid-April, when the weekly business index of the New York *Journal of Commerce* stood at 88.8, compared to 73.7 in 1935 and 100 for the 1927-1929 average.


RETAIL FOOD PRICES, COST OF LIVING
Retail food prices
Cost of living
Retail food prices (1923-1925=100) new base
Retail Food Prices (1913=100)
Cost of Living (1923=100)
1929 1930 1931 1932 1933 1934
F A J A O D F A J A O D
1935
1936

Keeping Up With the Field

- ***Revenue bill carries "windfall" levy—no process taxes***
- ***Wallace orders packers to quit merchandising practices***
- ***FTC finds fault with conditions in Chicago milk shed***
- ***Sugar Institute decision outlaws strict price agreements***
- ***Congress has four bills on sugar; three on meat packing***

Bill Includes Windfall Levy

PROVISION for an 80 per cent "windfall" tax on unpaid or refunded processing taxes is included in the revenue bill of 1936, introduced in the House April 21 by the Ways and Means Committee. Another section of the measure would refund about $35,000,000 of taxes imposed on floor stocks on hand at the time the AAA was invalidated, and some $8,000,000 more would be refunded on taxes on processed commodities that were exported or sold to tax-exempt institutions. As for taxes on corporate incomes, the measure repeals those now in existence, doing away with the exemption of dividends from normal income tax and eventually repealing capital stock and excess-profits taxes. A tax on corporation net income graduated according to percentages held in reserve would be substituted.

No new processing taxes are levied by the House bill, but these were requested by the Administration, and there is some reason to believe that the Senate will attempt to inject them.

Packers Get Desist Order

ELEVEN meat packing companies have been ordered by the Department of Agriculture to desist from price fixing, apportioning of territory and related practices in the merchandising of meats. Effective May 10, the order follows a series of hearings begun in May, 1934, during which 900 witnesses were examined.

According to testimony in the case, the packing companies agreed on certain price lists and established "closed" territory to which the list applied. Other agreements involved price wars and enforcement of arrangements to keep the trade in line. Evidence exhibited at the hearings included price lists with prices shaded or lowered to chain stores, telegrams complaining of prices being out of line and admonitions to keep lists secret.

The territory covered by the investigation included principally Tennessee, Mississippi, Alabama, Arkansas and Texas. The packers cited in this desist order are Armour & Co., Abraham Bros. Packing Co., Cudahy Packing Co., Jacob Dold Packing Co., John Morrell & Co., Memphis Packing Corp., Swift & Co., Wilson & Co., North American Provision Co., George A. Hormel & Co., and Birmingham Packing Co.

FTC Criticizes Dairies

CONDITIONS unfair to both the producer and the independent dealer are indicated in a report covering an investigation of the Chicago milk shed by the Federal Trade Commission.

A more equitable allotment of the amount of fluid milk which producers may supply to distributors is needed to correct a prevailing injustice, according to the report. And in this connection, the plan of payment in force specifies a reduction in price as the amount increases above the base allotment, so that a producer delivering 152 per cent of his base would receive the price for "condensary" milk, with no premium for quality.

The report further shows that a relatively high percentage of the consumer's dollar goes to the distributor; during the period of 1929-35, the producer's share ranged from a low of 34 cents in May, 1933, to a high of 48 cents during the latter part of 1934.

Prices for milk used in the production of evaporated milk, or "condensary" prices, are shown to be based on the price of 92 score butter on the Chicago market in combination with the price of "Twins" cheese quoted by the Wisconsin Cheese Exchange. The latter price, the report states, is determined at a fifteen minute meeting each week at which a small quantity of the cheese is sold for the purpose of fixing the price. These meetings are attended by representatives of a few large dairy and meat packing companies, no farmers or producers of bulk cheese being present.

The FTC also reports that the Milk Dealers' Bottle Exchange is operated for the benefit of large distributors and such other distributors as cooperate with them in maintaining uniform practices and stabilized prices. Moreover, the milk Wagon Drivers' Union, 60 per cent of the membership of which is in the employ of two large companies, is said to have frequently interfered with the work of employees of independents.

Would Extend Inquiry

ACTION is expected to be taken in the House early this month on a resolution introduced by Representative Gearhart to extend the Federal Trade Commission's agricultural-income inquiry into the processing of fresh fruits and vegetables. This resolution increases the appropriation made last year for the investigation from $150,000 to $300,000. If the resolution passes the House, the plan is to rush it to the Senate, where the chairman of the Interstate Commerce Committee, Senator Wheeler, is known to favor it.

Effect of Sugar Decision

PRICE regulation by any agreements which bind sellers to adhere to announced prices violates the anti-trust laws. In its essence, this is the significance of the Supreme Court decision in the Sugar Institute case.

Open price filing, and the sharing by the industry with its members and the

Conventions

MAY

6-7—Independent Millers' Association, Hotel Melbourne, St. Louis.
7-8—Glass Container Association of America, White Sulphur Springs, W. Va.
10-12—Certified Milk Producers' Association of America, Hotel Baltimore, Kansas City.
25-26—Associated Grocery Manufacturers of America, Greenbrier Hotel, White Sulphur Springs, W. Va.
29-June 3—National Cottonseed Products Association, Roosevelt Hotel, New Orleans.

JUNE

1-2—Flavoring Extract Manufacturers' Association, Hotel Pennsylvania, New York.
1-5—Association of Operative Millers, Baker Hotel, Dallas, Texas.
2-5—American Association of Cereal Chemists, Adolphus Hotel, Dallas, Texas.
8-12—National Confectioners' Association, Waldorf-Astoria Hotel, New York.
15-16—National Macaroni Manufacturers' Association, Edgewater Beach Hotel, Chicago.

DAYLIGHT WITHOUT WINDOWS

Hershey Chocolate Corp. has provided an elaborate room for visitors in the new windowless building at Hershey, Pa. The artificial illumination in this room gives a daylight effect, this having been obtained by surrounding each 750-watt incandescent lamp with a 30-in. mercury-vapor tube. Air conditioning and a soundproof ceiling add to visitors' comfort.

public of data regarding closed transactions, apparently would be legal so far as this decision is concerned. Washington interpreters think that the "rule of reason" as to monopolistic methods of merchandising has been little modified, if at all, by this important decision. But it does appear that the rule of reason is more clearly stated now. And it is expected in Washington that real progress can now be made if self-policing of trade matters by an industry, insofar as it stabilizes the affairs of business without too great a restriction on competition.

Mushroom Standards

STANDARDS of fill for canned mushrooms were promulgated by Secretary of Agriculture Wallace on March 21, to become effective 90 days from that date. A can of mushrooms contains excess packing medium under the regulations when the drained weight equals or exceeds the following amounts:

Overall Dimensions Sealed Can Diameter, Inches	Height, Inches	Trade Designation	Drained Mushrooms, Ounces
2⅛	2¼	202 x 204	2
2⅛	2	208 x 200	2.4
2 1/16	2⅜	211 x 212	4
2 1/16	3⅛	211 x 304	4.9
2 1/16	4	211 x 400	6.1
2 1/16	4⅛	215 x 408	8.5
3	4	300 x 400	8
3	4 7/16	300 x 407	8.8
3 7/16	4⅛	307 x 408	11.8
3 7/16	4 7/16	307 x 409	12

Canned mushrooms failing to meet these requirements must be labeled "Slack Fill—Contains Excess Added Liquid."

Food Bill Future Uncertain

ONE guess is as good as another as to whether the Copeland bill will be passed this session of Congress. For a time the bill appeared a dead issue, but a subcommittee recently started revising it for presentation before the House, reportedly as the result of a request from the White House. Two points of particular interest remain to be cleared up. One is in regard to multiple seizures, which the Food & Drug Administration insists is necessary if the bill is to be enforceable. The other regards transfer to the Federal Trade Commission of the task of enforcing advertising provisions of the measure.

Four Sugar Bills

FOUR new bills were introduced into Congress, two in the Senate and two in the House, between April 1 and April 15 for the purpose of continuing gains made in the sugar industry under the Jones-Costigan Act. Senator Harrison, who introduced the first of the bills, described this measure as re-enacting in suitable legal form the sugar-quota provisions of the AAA Act as amended by the Jones-Costigan Act. The other three bills follow the general plan of the Harrison bill, although differing in some provisions.

Three Packer Bills

LEGISLATION affecting packers has been rampant in Congress recently. Senator Capper introduced a bill to curb direct buying, to permit the Secretary of Agriculture to examine packers' books and to otherwise change the present law. To obviate the menace of this measure, the Connally-Murphy Bill was introduced in the Senate. Already it has passed that body. Washington observers, however, believe that it never will become a law.

The Murphy bill would open the books of packing firms to government observation and would require packers to file a bond covering financial obligations as a buyer of livestock. Moreover, it would open the door to complaints and force lengthy investigations of an accused packer's activities.

Another bill would transfer to the Federal Trade Commission regulation of packers under the packers and stockyards act.

●

Concentrates

▶ INCREASED dairy production is considered inevitable under the soil conservation program by unofficial dairy experts in Washington. . . . An increase of 175,537 tons in the 1936 sugar quota was announced April 10 as a result of a revision in estimated consumption. . . . More than 100,000 gal. of tea-seed oil has been impounded and will be destroyed by the Department of Agriculture in its successful war against adulteration of olive oil.

▶ FIFTY-NINE ice cream manufacturers are being sued in the United States District Court at Los Angeles by Mills Novelty Co., which asks $54,838,572.32 for damages resulting from alleged activities on the part of the ice cream industry to hinder the sale of counter freezers. . . . Chicago's city council has passed an ordinance requiring federal inspection of canned poultry. . . . Tri-State Packers' Association recently adopted a resolution commending Great Atlantic & Pacific Tea Co. for using grade labels on canned food.

▶ THE pilchard fishing and processing industry is expanded rapidly in the Pacific Northwest. . . . Fruit and vegetable wastes are to be used in the production of alcohol at Portland, Ore. . . . The Wisconsin anti-Sunday baking law was held unconstitutional April 3 in Milwaukee circuit court.

▶ American Bottlers of Carbonated Beverages has made arrangements with Lloyd's of London for protection of members against consumer damage claims.

Men . . . Jobs . . . and Companies

Industry

• ARMOUR & Co., Chicago, has purchased the plant of Birmingham (Ala.) Packing Co.

• BALLARD & BALLARD CO., INC., Louisville, recently opened a plant in Jersey City, N. J.

• BORDEN Co., New York, is marketing ice cream in a package which will fit into the ice tray of a refrigerator.

• CAMPBELL SOUP Co. will construct a large addition to its plant at Camden, N. J., this being scheduled for completion July 1.

• CARNATION Co. is erecting a $250,000 condensary, with a daily capacity of 200,000 lb. of milk, at Sulphur Springs, Tex.

• CROSSE & BLACKWELL, LTD., Toronto, is to be acquired by business interests in Colborne, Ont., it is reported. The reorganized company will engage principally in export trade.

• CUDAHY PACKING Co. will build a general-purpose packing plant at Albany, Ga., as a result of the increase in livestock production in the South.

W. MASON SMITH

A specialist in problems dealing with organization, merchandising, personnel and financial matters, he has been appointed assistant general manager of operations by Kroger Grocery & Baking Co., Cincinnati.

• ENZO JEL Co. plans to expand manufacturing facilities at Sheboygan, Wis., and to establish a testing kitchen.

• GENERAL BAKING Co. has taken a five-year lease on a plant in Huntington, N. Y., this to be put into service May 1.

• GENERAL FOODS CORP., New York, has ordered twenty refrigerating systems with which to expand operations in quick-freezing peas. The company packed a million pounds of quick-frozen peas in 1934, three million in 1935 and expects to pack eight million this year.

• HANSEN PACKING Co., Butte, Mont., is suing Armour & Co. and Swift & Co. for $6,000,000 in damages, charging unfair competition under the Clayton Act and violation of the Sherman Anti-Trust Act.

• HECKER-H-O Co., INC., has moved its general executive office from Buffalo to New York.

• KRAFT-PHENIX CHEESE CORP. will construct in Chicago this summer a new cheese factory, cold-storage plant and office building of eight stories, the cost being in excess of $1,000,000. The present plant will be utilized for storage purposes. The company has opened a new distributing unit at San Antonio, and it plans a cheese plant at Columbus, Miss. Kraft recently added two new confectionery items to its line, toffee and bulk caramel.

• LOUDEN PACKING Co. has acquired the Saratoga, Ind., plant of E. Pritchard.

• NATIONAL BISCUIT Co., New York, is suing Ralston Purina Co., St. Louis, to enjoin that concern from using "Shredded" or "Shredded Wheat" in advertisements or on packages.

• DR. PEPPER BOTTLING Co. opened a new, modern plant at Chattanooga, Tenn., April 16.

• SOUTHERN SHELLFISH Co. is erecting a new shrimp canning plant at Biloxi, Miss. The capacity will be 350 bbl. of shrimp daily. The company recently remodeled another Biloxi plant which it purchased.

• SNIDER PACKING Co. will pack corn and tomatoes this season at the Monroe Falls, N. Y., plant, closed since 1932.

• SWIFT & Co., Chicago, recently extended its ice cream business to Oklahoma, taking over three plants of Colvert Ice Cream Co. The company has entered the cottonseed-oil business in Mississippi through the purchase of Lauderdale Cotton Co., Meridian.

MARY M. BROOKE

She has left Puritan Mills, Inc., where she was director of laboratories and service, to take charge of new research laboratories opened by National Baking Co., Omaha. The new laboratories will serve the Omaha Flour Mills and Omar Bakeries. Mrs. Brooke has been chief chemist for Schulze Baking Co., Grennan Bakeries and Purity Baking Corp.

• WILSON & Co., Chicago, has acquired the Okolona (Miss.) Cheese Co. plant, and is expected to establish a cheese plant at Camden, Ark.

Personnel

• M. JACOB ABRAMS, who founded and was former head of Jersey Meadow-Gold Co., has gone back with the company as president after two years in another business.

• HARRY BUCK has been named manager of Stokely Bros. plant in Cumberland, Wis., succeeding D. H. Steinberg, now production manager for five Stokely plants.

• EARL BYRON COX, formerly production manager of Cox Baking Co., now has charge of cake production for Scotland Bakeries, Inc., which has plants at Mount Vernon, N. Y., and at Orange and Plainfield, N. J.

• A. B. EWING, Kansas City official of Loose-Wiles Biscuit Co. now is a member

of of the board of directors, having replaced the late J. L. Brown.

• WALTER L. JUSTIN has been advanced from executive vice-president to president of Philadelphia Dairy Products Co.

• DR. E. F. KOHMAN, who is connected with the research laboratory of National Canners' Association, recently made a trip through the South during which he spoke before several scientific groups on "Chemistry and Canning."

• F. H. MASSMAN, vice-president of National Tea Co. for several years, becomes president to succeed George Rassmussen.

• WM. F. R. MURRIE, president of Hershey Chocolate Corp., again has been elected president of Association of Cocoa & Chocolate Manufacturers of the United States.

• G. W. NEIL has been transferred from the Fort Worth plant of Armour & Co. to Los Angeles, where he is superintendent of Hauser Packing Co., Armour subsidiary.

• LOUIS RAUSCH, who has been manager of production with Scotland Bakeries, Inc., now is operating a retail establishment at Rego Park, N. Y.

• HUMPHREY O. ROBERTS, president of Uganik Fisheries, has been re-elected president of Northwest Salmon Canners' Association, LAURENCE FREEBURN, Pyramid Packing Co., was elected vice-president.

• C. M. RUTTAN, president of City Dairy Co., Ltd., Toronto, now is a vice-president in charge of public relations of Borden's, Ltd.

• GEORGE B. SIPPEL for fifteen years superintendent of the Cincinnati manufacturing branch of Standard Brands, Inc., has become vice-president in charge of production of Burger Brewing Co., Cincinnati.

• F. W. STOEHT has become a vice-president of Armour & Co. in charge of branch-house and car-routes departments. He succeeds I. M. HOAGLAND, now general manager of Virden Packing Co., San Francisco subsidiary of Armour.

• MILTON SPIEGLE again heads up Oklahoma Bakers' Association. He is with Seminole (Okla.) Baking Co.

• ELSIE STARK, noted home economist, has been made head of the home-economics department of Best Foods, Inc., New York.

• ALBERT H. STOLDT, Monroe, has been elected president of Wisconsin Swiss & Limburger Cheese Producers' Association.

• JAMES G. VAIL heads up the American Section of Society of Chemical Industry for the coming year. Wallace P. Cohoe is vice-chairman.

• C. L. WEBBER recently took over the plant of Martinsville (Va.) bakery. He has been in the baking business in Winston-Salem and Charlotte, N. C., for several years.

• EARL WEISBROD has been elected president of Holes-in-Bread Club, New York.

• D. C. WESTENHAVER, president of Columbus (Ohio) Cookie & Cake Co., recently was re-elected president of Central Ohio Bakers' Association.

Deaths

• C. M. ALDRICH, 76, general manager of Wilson & Co.'s Nebraska City plant, April 11.

• CHRISTOPHER G. ARMSTRONG, 71, founder of Chelmsford Ginger Ale Co., president of Sussex Ginger Ale Co. and vice-president and director of Canada Dry Ginger Ale Co., April 20, at Chelmsford, Mass.

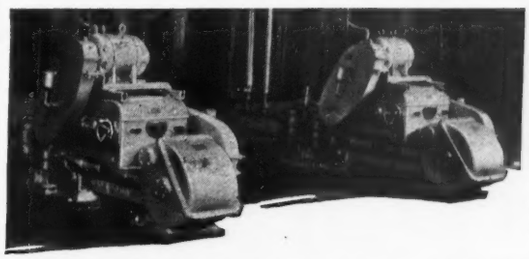
NO IMPURITIES CAN GET INTO YOUR FOOD PUMPS IF YOU USE KLERO PACKING

KLERO has a melting point of well over 230° F.

Send for Free Working Sample. State Size.

The lubricant in *"KLERO,"* having a high melting point, will give long economical service on pumps handling hot soups, materials to be canned, and foodstuffs in general, especially where the temperature is high.

No odor, taste or stain can get to the finished product.



Oily graphite, grease, or other lubricants containing contaminating ingredients, should not be used.

"KLERO'S" lubricant allows the use of a well-lubricated packing on rods and shafts of food pumps without jeopardizing the purity of the product.

PROTECT THESE PRODUCTS AGAINST CONTAMINATION

MILK PRODUCTS
FRUIT JUICES
SOUPS
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Please send, without obligation, of course.
Sample of packing ☐. Descriptive Literature ☐.
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• DUDLEY M. DORMAN, 61, chairman of the board of Creameries of America, March 21. He was largely responsible for the formation of Western Dairy Products Corp.

• JOSEPH HEULER, 73, founder of the Pittsburgh bakery bearing his name, March 28.

• GEORGE A. HOERNLE, 62, vice-president and general manager of Drake Bakeries, Brooklyn, N. Y., recently. He was a vice-president and director of Ward Baking Co. until 1928.

• DAVID HUYLER, 53, retired factory manager and treasurer of the New York confectionery company bearing his name, April 6.

• EZRA LAMBERT, 106, said to be the oldest flour miller, March 28, at Lockport, N. Y. He served four decades as manager of a flour mill located at Niagara Falls, N. Y.

• ROBERT E. S. WARD, 78, who was long associated with his brother, William S. Ward, in the bakery supply business, April 2.

C. B. MORISON

Noted food chemist and dean of the school of American Institute of Baking, who died, April 17, at Evanston, Ill.

• LOUIS WEDERTZ, 76, president of Lakeside Packing Co., Manitowoc, Wis., April 9.

• FRED WIRZ, 68, president of Moline Sausage Co., recently.

• JOHN G. WOODWARD, 76, president of John G. Woodward Candy Co., Council Bluffs, Iowa, March 21. He built a huge confectionery business, starting it as a side line.

Associated Industries

• AMERICAN CAN CO., New York, is sponsoring a nation-wide menu-recipe contest to promote canned foods.

• CONTINENTAL CAN CO., INC., will increase the size of its Houston, Texas, plant at a cost of $250,000.

• CREAMERY PACKAGE MANUFACTURING CO. has enlarged its Seattle headquarters to a full branch, under the managership of H. F. Stevenson.

• CROWN CORK & SEAL CO. has obtained options on patents and processes pertaining to the manufacture of glass. Also, the company is to buy outstanding stock of Acme Can Co., Philadelphia, and equip that firm's plant for rolling aluminum and cold rolling steel.

• OWENS-ILLINOIS PACIFIC COAST CO. is building a glass-container plant in Oakland, Calif.

• REO MOTOR CAR CO., Lansing, Mich., has adopted a 6 per cent finance plan for buyers of its trucks.

Most Recent Bundling Machine Installation
Chas. B. Knox Gelatine Co.

LARGE SAVINGS
with Machine Bundling

More and more, manufacturers of packaged products are going over to machine bundling—because it makes such remarkable savings.

An immediate saving of at least 60% is made on material costs, due to the elimination of expensive boxes. In addition, there is a saving of from $2,000 to $5,000 a year on labor, because the cartons are fed automatically to the bundler from the cartoning or wrapping machines.

Transportation costs are lowered too (both to your factory and out)—wrapping material weighs only one-third as much as containers. And the rolls of paper occupy far less storage space.

In many instances these savings pay for the cost of the bundling machine in a few months' time.

The machine bundles the packages in strong but inexpensive paper—in dozen or half dozen, or quarter dozen lots. Either plain or printed paper may be used, the machine registering the printed panels perfectly. It also attaches end-seals.

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Over 200 Million Packages per day are wrapped on our Machines

Cocoa Selection

(Continued from page 229)

the formation of higher alcohols and acids such as butyric acid. Smoky flavors are often the result of drying the beans by artificial means.

Cocoa beans are more specifically examined as follows: When they are cut, they should show a well-filled seed of the color to correspond to the variety and grade of that particular bean. If over 5 per cent of the beans are slaty, or of violet or purple color they are undesirable. The mark of good quality is an even rich brown to a pale cinnamon brown color. The kernels should be neither tough nor hard but easily broken when light pressure is applied. Foreign matter consisting of stones, dust, shriveled beans, pieces of string, nails, coins and other miscellaneous objects should not exceed one-half per cent in total weight of the beans. It is desirable that clayed beans should not contain more than one per cent of clay by weight. The beans should show only traces of molds or grubs. Yellowish patches of mold are especially objectionable, as 3 per cent may be sufficient to impart a musty flavor to the products produced from such beans. Strongly acid odors or odors of hammy, cheesy, or earthy character should be avoided, as they indicate improper fermentation, unsuitable temperatures and unclean handling. These odors can best be discerned by rubbing some cocoa beans between the palms of the hands and smelling them. Some of the foreign odors can be dissipated by careful roasting.

It is desirable to select cocoa beans which run fairly uniform in size. Large beans usually contain less shell and waste and are often the product of proper fermentation and handling. There should be but few broken beans because loose shells have the tendency to become detached from the nibs during roasting, to stick to the drum of the roaster and to be scorched thereby impairing the flavor quality of the beans. Flat beans are more difficult to roast. They are often the result of improper fermentation or of fermenting the beans from cocoa pods which are not quite ripe. Such beans may also result from drafty, incomplete, or imperfect curing. Certain varieties of beans, like the Calabacillo, are naturally flatter; they are also considered inferior.

Unfermented beans or beans which have been partly fermented are somewhat inferior in color and odor and are regarded as likely to become moldy. Over-fermented beans are also undesirable because the shells of these beans may be easily broken or become loose on handling. The over-fermented beans may show brown spots due to excessive oxidation of the coloring matter. Unripe beans should be avoided as they are usually small, flat, and imperfectly formed as well as of a poor color. They tend to a violet or purple cast and are difficult to break because they are usually hard and compact. The shell is difficult to remove because of the tightness with which it clings to the nibs. These beans also possess a harsh, sour, and bitter flavor.

Thoroughly ripe, and properly fermented beans are plump and round, and the kernels are loose in the shells. They possess a clean aroma, break easily, and have a full rich color peculiar to the variety of beans represented. They are fairly uniform in size and contain their full normal content of cocoa butter.

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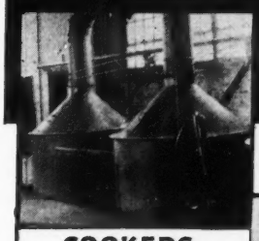
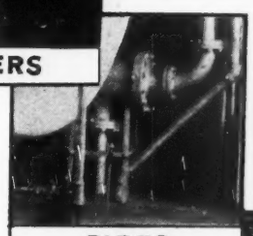

COOKERS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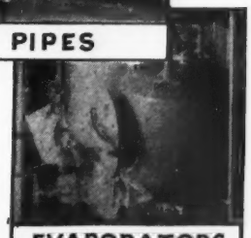
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TRADE MARK REG. U.S. PAT. OFF.
SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

PATENTS

Flavoring Materials Injected Into Stream of Partially Frozen Ice Cream While Confined and Subjected to a Pressure Greater Than Atmospheric—Herbert A. Bendfelt, Shorewood, Wis., to Vogt Processes, Inc., Louisville, Ky. Nos. 2,032,970 and 2,032,971. March 3, 1936.

From 0.1 to 2.0 Per Cent of Calcium or Magnesium Carbonate Added to Stabilize Yeast Food Containing Approximately 0.64 oz. Ammonium Chloride, 1.76 oz. Calcium Sulphate, 0.0176 oz. Potassium Bromate, and 1.4 oz. Flour—Helman Rosenthal, Dallas, Texas. No. 2,033,009. March 3, 1936.

Urea and an Ammonium Salt Added in Small Quantities as Ingredients in Manufacture of Leavened Bread—Herbert H. Bunzell, New York, N. Y. No. 2,033,180. March 10, 1936.

Beer Wort Seeded With Yeast in a Continuout Manner—William F. Clark, Chicago, Ill. No. 2,033,326. March 10, 1936.

Mayonnaise Made in a Continuous Process—Charles F. Chapman to Kraft-Phenix Cheese Corp., Chicago, Ill. Nos. 2,033,412 and 2,033,413. March 10, 1936.

Granulated Sugar Freed From Sugar Dust by Air Separation—Gustave J. Daley, Stockton, Calif. No. 2,033,416. March 10, 1936.

Casein Precipitated From Skim Milk by Addition of Rennet and Subsequently Spray Dried—David D. Peebles, Eureka, Calif., to Western Condensing Co., San Francisco, Calif. No. 2,034,056. March 17, 1936.

Biscuits Removed From Baking Pans in an Automatic Manner—Eugene F. Marresford, to National Biscuit Co., New York, N. Y. No. 2,034,108. March 17, 1936.

Shrimps Shelled by Mechanical Means—Viggo Bottker & Bjarne Grondahl to Alaskan Glacial Seafood Co., Seattle, Wash. No. 2,034,691. March 24, 1936.

Cans Given a Full Wrap and Label by Machine—Josef F. Mose, Point Loma, Calif. No. 2,034,727. March 24, 1936.

Eggs Mechanically Graded for Size—Henry C. Haslam, Chowchilla, Calif. No. 2,034,946. March 24, 1936.

Liquid Automatically Measured and Discharged Into Containers by a Reciprocal-Acting Piston Pump—Albert R. Thompson, to Food Machinery Corp., San Jose, Calif. No. 2,034,964. March 24, 1936.

Yeast Grown in a Continuous Manner by Heavy Seeding of Wort Maintained at an Optimum Nutrient Concentration.—Stephan Darányi, Hamburg, Germany. No. 2,035,048. March 24, 1936.

Soybean Flour Used as Carrier for Oleoresins and Essential Oils of Spices for Flavoring of Food Products—Arthur A. Levinson, and Lawrence K. Pillsbury to William J. Stange Co., Chicago, Ill. No. 2.035,136. March 24, 1936.

Coffee Beans Cleaned by Gravity Separation in Water—Tollef Bache Mönniche, Boquete, Panama. No. 2,035,139. March 24, 1936.

Soybean Protein Used as Substitute for Cow's Milk in the Manufacture of Yeast Leavened Bread—Michele Bonotto, Torino, Italy, to American Soya Products Corp., Evansville, Ind. No. 2,035,586. March 31, 1936.

Juices Aseptically Obtained From Fruit and Handled in an Atmosphere Free of Uncombined Oxygen—Lloyd W. Robinson, two-fifths to Harry J. Porter and one-fifth to Geoffrey D. Elmer, Detroit, Mich. No. 2,035,619. March 31, 1936.

Cream Continuously Pasteurized and Deaerated by Spraying Into Chamber Into Which are Discharged Jets of Steam—Roy C. Simonds, Aberdeen, S. Dak. No. 2,035,842. March 31, 1936.

Rotary Conge for Refining Chocolate Paste by a Series of Rolls Operating Against Each Other and Against a Supporting Bed—Fred S. Carver, East Orange, N. J. No. 2,035,863. March 31, 1936,

Grains, Fruits and Vegetables Given Heat Treatment Under Reduced Pressure in a Closed Receptacle Equipped With a Condenser From Which Fluids Can be Recovered—Augustinus Edvard Jonsson, Stockholm, Sweden. No. 2,035,893. March 31, 1936.

Whey Solids and Partially Hydrogenated Vegetable Oils Combined to Form Shortening for Bakery Products—George Howard Kraft to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,035,899. March 31, 1936.

Brew Kettle Equipped With Two Series of U-Shaped Heating Tubes Spaced Around Interior of Separate Halves of Kettle in Opposition to Each Other—Alvin Hock, Cincinnati, Ohio. No. 2,035,962. March 31, 1936.

Cheese-Coated Potato Chips Made by Deep Frying in Fat to Which Partially Dry Cheese Has Been Added—Reuben Romney, Jr., to Cheezits Corp., Salt Lake County, Utah. No. 2,036,360. April 7, 1936.

Wine Stored Under Atmosphere of Preservative Gas—Albert B. Scott, Los Angeles, and Garnett R. Robertson, Manhattan Beach, Calif., to Alfred B. Scott, Los Angeles. No. 2,036,505. April 7, 1936.

Tank Agriculture

(Continued from page 220)

variable outlet at the lower end of each tank carries the overflow into a return line which ends at a sump at the boiler plant. Liquid is pumped into the boiler, heated and then returned to the supply line. The tomato crop marketed during the 1936 winter season was in direct competition with hothouse fruit.

Another typical installation is that of Vetterle and Reinelt at Capitola, Calif. It consists of a double unit greenhouse 80x200 ft. containing 66 concrete tanks, 36 ft. x 4 ft. x 6 in. arranged in two rows of 33 each. The basins are insulated on their bottoms with 6 in. of beach sand to reduce any heat losses into the soil.

Heating of each tank at Capitola is accomplished by three 120-ft. lengths of G.E. soil-heating cable arranged in parallel across 220 volts, or a total of 2,400 watts per basin. The tanks are connected in pairs and each pair is controlled by a separate 30-amp. switch and thermostat. Each row of 33 tanks is arranged in two groups of twelve tanks and one of nine with sufficient feeder capacity provided to the latter for the addition of three more tanks. Each group of twelve tanks is controlled by 120 amp., three-phase switch. Service is from a three-conductor, 600,000-circ.mil, 220-volt cable. The main electric service consists of three 750,000-circ.mil. cables with a 600 amp. main service switch. Total connected load is 158.4 kw.

Greenhouses and tanks for this installation were completed late in October, 1935. Two varieties of English greenhouse tomatoes, Sutton's Best and Sutton's Majestic were planted. Initial temperature maintained in the nutrient liquid was 80 deg. F. This was later reduced to 75 deg. F. and finally to 65 deg. after the plants had begun producing. Load charts show that energy consumption averaged approximately four hours per day, with most of the consumption off-peak. A typical chart showed consumption between 11:30 p.m. and 1:30 a.m. and 6 a.m. and 8 a.m. It is believed that by increasing the temperature of the nutrient liquid during the night hours so as to store heat, the entire heating load could be confined to off-peak hours with resultant economy in cost of electricity. With the 66 tanks in operation, the average consumption between November and March was 30,000 kw.-hr. per month. As outdoor temperatures increased, the consumption also fell off.

The tomato vines began to bear in February, 1936. As this article is being written, peak production has not yet been reached, although a total producing period of 100 days is indicated, all of which will be off-seasonal. The proprietors of the installation appear to be well satisfied with its operation up to the present.

Small installations have been made for studying the technique for the ultimate purpose of commercial growing of flowers at Richmond, Calif., and a similar one for strawberries at Watsonville.

Ultimate developments and significance of the new culture technique in tanks for production of certain crops appear to be limitless. Needless to say it portends revolutionary developments in certain phases of agricultural production, particularly of certain truck crops of particular interest, either directly or competitively, for the canning industry and the frozen food industry. It also offers a potential load for the electric utilities where rates are suitable. Freedom from plant pests occurring in soil is one of the apparent advantages of the new agricultural technique.